**City: MIAMISBURG**
***MOUND PLANT (USDOE)***

## Site Information:

**Site Name:** MOUND PLANT (USDOE)
**Address:** MIAMISBURG, OH

**EPA ID:** OH6890008984
**EPA Region:** 05

## Record of Decision (ROD):

**ROD Date:** 06/12/1995
**Operable Unit:** 01
**ROD ID:** EPA/ROD/R05-95/292

**Media:** groundwater, waste materials, soil

**Contaminant:** VOCs, vinyl chloride, trichloromethane, 1,2-cis-dichloroethene, TCE, tetrachlorethene, 1,1,1-trichloroethane, radium-226, 2,3,7,8-TCDD, arochlor-1248, benzo(a)pyrene, benzo(b)flouranthene, plutonium-238, strontium-90

**Abstract:** Please note that the text in this document summarizes the Record of Decision for the purposes of facilitating searching and retrieving key text on the ROD. It is not the officially approved abstract drafted by the EPA Regional offices. Once EPA Headquarters receives the official abstract, this text will be replaced.

The U.S. Department of Energy (DOE) Mound Plant site is located within the southern city limits of Miamisburg, Ohio. The site is approximately 10 miles south-southwest of Dayton and 45 miles north of Cincinnati. Miamisburg is predominantly a residential community with some supportive commercial facilities and limited industrial development. Much of the residential, commercial, and industrial development within a 5-mile radius of the site is concentrated on the Great Miami River floodplain. The adjacent upland areas are used primarily for residences and agriculture or are unused open spaces.

Mound Golf Course and Miamisburg Mound State Memorial Park, both directly east of the facility across Mound road, are heavily used during favorable weather. The park is the site of a 68-foot high

ancient Indian Mound, located 380 feet east of the Mound Plant boundary. Other recreational areas within 1 mile of the facility include the Miamisburg municipal park and swimming pool, located immediately west of Mound Plant, Harmon Athletic Field, and Library Park. These areas are used extensively during the summer.

There are no large lakes within a 5-mile radius of the site. Some vestiges of the old Miami-Erie Canal lie between the Conrail Railroad and the Dayton-Cincinnati Pike west of the site. The remnant of the old Miami-Erie Canal is designated as Operable Unit (OU4). The major water body in the vicinity of the Mound Plant is the Great Miami River. It is approximately 150 to 200 feet wide in this area.

Agricultural land within a 5-mile radius area around the site is primarily used for corn and soybean production and for livestock grazing.

The population of Miamisburg is 17,834, Dayton is 182,044, and Montgomery County is 573,809. The only historic landmark in the vicinity of Mound Plantis the Miamisburg Mound, an ancient Indian mound located 280 feet east-southeast of Mound Plant in Miamisburg Mound State Memorial park. The mound - a symmetrical, conical earthwork 68 feet high and 800 feet in perimeter - is one of the largest of its type. It is believed to be the sepulcher of a chief of the Adena culture of Mound Builders, who inhabited the Ohio region as early as 800 B.C.

OU1 also includes the three plant production wells located along the southern plant boundary. An extended discussion of OU1 history, including waste disposal and construction activities, is provided in the Remedial Investigation (RI) report.

The former waste disposal sites within OU1 (the historic landfill and associated features) are concentrated within, beneath, and immediately adjacent to the current site sanitary landfill. These waste disposal sites are the result of a long history of dumping, burning, moving, reworking, burying, and partially removing wastes and placing them into the engineered structure (the site sanitary landfill). Currently, the area bounded by the overflow pond to the north, the paved roads to the west and south, and the bunker area to the east can be considered a single entity. It is internally heterogeneous; not all portions are contaminated. However, subdividing the area does not increase understanding of the transport phenomena that are occurring, nor does it facilitate developing remedial alternatives.

Mound Plant was established at its present location in 1948. Currently, the facility is operated by EG&G Mound Applied Technologies for DOE as an integrated research, development, and production facility that supports the DOE weapons and energy programs. To reconfigure and consolidate the nuclear complex, DOE has decided to phase out the future defense mission. As a result, the Mound site has been designated an environmental management site and the plant is in the process of being converted into a commercial and industrial site.

OU1, also identified as Area B, occupies approximately 4 acres in the southwestern portion of the Mound Plant. OU1 includes a historic landfill site that was used by the Mound Plant from 1948 to 1974. Plant waste materials that were disposed of in OU1 included general trash and liquid waste. Much of this waste was later relocated and encapsuled in a site sanitary landfill constructed in 1977. An overflow pond was constructed at the same time, partially covering the historic landfill site. After 1974, waste was no longer disposed of in OU1. There are known releases of volatile organic compounds (VOCs) from OU1 into the adjacent Buried Vallet aquifer (BVA). In addition, tritium was detected in water samples taken from wells in OU1, although the concentration was below the drinking water maximum contaminant level.

Cut and fill activities and refuse and waste disposal occurred within OU1 from 1948 to 1974. No written manifests of the waste types and quantities exist, and uniform disposal practices were not followed.

Before 1947, OU1 was a residential area with two or three small houses and storage buildings. During plant construction, the area was exploited for its gravel deposits. Removal of gravel was routine until 1977.

The old gravel excavation and the disturbed area just north of the excavation were used for a landfill, including open burning of trash and garbage from plant operations. A burn cage, consisting of a wire mesh structure that caught ashes from burning wood, paper, and other materials, was used. Solid waste, mostly paper, office, and kitchen garbage, was placed in the burn cage and ignited to reduce its volume.

In 1954, the first burial at OU1 occurred along the southern boundary of the old gravel quarry, just north of and parallel to the east-west road that climbs the SM/PP Hill. A backhoe was used to excavate an irregularly shaped trench to the maximum depth possible. Residual steel and metal debris were progressively buried in the trench. The

debris and backfill were regraded to just below the road level.

During 1955 and 1956, empty drums that had contained thorium were buried in the southwest corner of OU1. A shallow excavation was made, and about 2,500 55-gallon drums were crushed and then covered with a thin layer of soil cover. The buried drums and backfill were regraded to just below the level of the road. In 1969, the state of Ohio banned open burning, and Mound Plant prohibited open burning of solid and liquid waste in OU1. Hazardous liquid waste was collected and disposed of off site. Solid waste was placed in east-west trending trenches cut by a bulldozer.

In 1977 and 1978, the overflow pond and site sanitary landfill were constructed on the site of OU1. The overflow pond was built to complement the low-flow retention basins, which were constructed in 1976 on the lower reach of the plant drainage ditch. Much of the solid waste in the historic landfill was excavated and moved to the site sanitary landfill. Generally, debris from the Dayton Unit fire in the first trench and empty, crushed drums that had contained thorium in the second trench were not excavated and remained under the landfill. The volume excavated was limited by the volume required for the pond construction.

The pond was built with a natural clay-bearing compacted glacial till liner and earthen dikes. It has a 5,000,000 gallon capacity. Effluent in the overflow pond is discharged through a standpipe in the northwest corner of the pond to the stilling basin below the low flow retention basins. It then goes to the Miami-Erie Canal and to the Great Miami River through National Pollutants Discharge Elimination System (NPDES) Outfall 002 at a rate of approximately 660,000 gallons per day.

As of 1995, OU1 remains much as it did in 1978 after the overflow pond and site sanitary landfill were constructed. The road along the north and west boundary had been paved and, in the 1980s, a bridge was built over the overflow channel from the plant drainage ditch to the overflow pond.

**Remedy:** This remedial action is the first of several actions planned as part of the overall remedial action for the Mound Plant site. The function of this remedial action is to control groundwater contamination to prevent migration of contamination toward the Mound Plant production wells and to minimize exposure to potential receptors. The pathway of concern consists of leaching of contaminants from site soils or disposed waste; entrainment in the groundwater flow; and withdrawl by the Mound Plant production wells or by other future wells.
The selected remedy for OU1 is collection and treatment of contaminated groundwater and disposal of treated water. The precise method for treating the contaminated water will be determined during the remedial design phase of the project. All extracted groundwater will be treated to levels that comply with the requirements of the Mound Plant NPDES Permit.

The major components of the selected remedy include: installing two groundwater extraction wells within OU1, using standard equipment and procedures; treating the extracted groundwater to remove VOCs and other constituents, as required, using cascade aeration, UV oxidation, conventional air stripping, or other suitable treatment units; discharging the treated groundwater to the Great Miami River through the existing plant NPDES outfall or a new outfall. Following installation and operation of the groundwater extraction wells, the chemical properties and hydraulic behavior of the groundwater system will be monitored to verify the adequacy of the remedy.

**Text:** Full-text ROD document follows on next page.

Text:

# ENVIRONMENTAL RESTORATION PROGRAM

# OPERABLE UNIT 1

# RECORD OF DECISION

# MOUND PLANT

# MIAMISBURG, OHIO

June 1995

U.S. DEPARTMENT OF ENERGY

OHIO FIELD OFFICE

ENVIRONMENTAL RESTORATION PROGRAM

EG&G MOUND APPLIED TECHNOLOGIES

Final

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## ACRONYMS

| | |
|---|---|
| ARAR | applicable or relevant and appropriate requirements |
| BVA | Buried Valley aquifer |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| COC | contaminant of concern |
| COPC | contaminant of potential concern |
| CTE | central tendency exposure |
| D&D | Decontamination and Decommissioning |
| DCA | dichloroethane |
| DCE | dichloroethene |
| DOE | U.S. Department of Energy |
| ECAO | Environmental Criteria and Assessment Office (EPA) |
| FS | feasibility study |
| ft | feet |
| HEAST | Health Effects Assessment Summary Tables |
| HI | hazard index |
| HQ | hazard quotient |
| IRIS | Integrated Risk Information System |
| MCL | maximum contaminant level |
| MESH | Miamisburg Environmental Safety and Health |
| NCP | National Contingency Plan (CERCLA) |
| NPDES | National Pollutant Discharge Elimination System |
| NPL | National Priority List (EPA) |
| OAC | Ohio Administrative Code |
| OEPA | Ohio Environmental Protection Agency |
| OU | operable unit |
| PCB | polychlorinated biphenyl |
| PCE | tetrachloroethene |
| pCi/L | picocuries per liter |
| PRG | preliminary remediation goal |
| RAPCA | Regional Air Pollution Control Authority |
| RfC | reference concentration |

| | |
|---|---|
| RfD | reference dose |
| RI | remedial investigation |
| RIR | remedial investigation report |
| RME | reasonable maximum exposure |
| ROD | Record of Decision |
| SARA | Superfund Amendments and Reauthorization Act |
| SDWA | Safe Drinking Water Act |
| TBC | to be considered |
| TCA | trichloroethane |
| TCDD | tetrachlorodibenzo-p-dioxin |
| TC E | trichloroethene |
| USEPA | U.S. Environmental Protection Agency |
| UV | ultraviolet |
| VOC | volatile organic compound |
| æg/L | micrograms per liter |



# RECORD OF DECISION
# OPERABLE UNIT 1
# AREA B, MOUND PLANT, OHIO
# June 1995

## DECLARATION

## 1. SITE NAME AND LOCATION

Operable Unit 1, Area B
Mound Plant
Miamisburg, Montgomery County, Ohio

## 2. STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for Operable Unit (OU) 1 at Mound Plant, Miamisburg, Montgomery County, Ohio, which is one of six distinct areas that comprise one contiguous site as listed on the National Priorities List (NPL) (Administrative Docket Number VW-90-C-075). This remedial action was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision is based on the administrative record file for this site.

## 3. ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health and welfare or the environment.

## 4. DESCRIPTION OF REMEDY

This OU remedial action is the first of several actions planned as part of the overall remedial action for the Mound Plant Site. The function of this remedial action is to control groundwater contamination (primarily dilute volatile organic compounds [VOCs]), to prevent migration of contamination toward the Mound Plant production wells and to minimize exposure to potential receptors. The pathway of concern consists of leaching of contaminants from site soils or disposed waste; entrainment in the groundwater flow; and withdrawal by the Mound Plant production wells or by other, future wells.



This remedial action is not the final remedial action for the Mound Plant Site, but is intended to be a final remedial action for OU 1. The decisions regarding remedial actions for other portions of the plant are being addressed in other OUs. These decisions will ultimately be considered in a Site-wide remedial investigation (RI) and feasibility study {FS), which are in progress. Additional response actions, if warranted, are yet to be identified or planned. A decision on the final remedial action for the Site will be made in a subsequent decision-making process.

The selected remedy for OU 1 is collection and treatment of contaminated groundwater and disposal of treated water. The precise method for treating the contaminated water will be determined during the remedial design phase of the project. All extracted groundwater will be treated to levels that comply with the requirements of the Mound Plant National Pollutants Discharge Elimination System (NPDES) Permit. This remedy was selected using the remedial evaluation criteria set forth in the National Contingency Plan, 40 CFR Part 300.

The major components of the selected remedy include:

- Installing two groundwater extraction wells within OU 1, using standard equipment and procedures.

- Treating the extracted groundwater to remove VOCs and other constituents, as required, using cascade aeration, UV oxidation, conventional air stripping, or other suitable treatment units.

- Discharging the treated groundwater to the Great Miami River trough the existing plant NPDES outfall or a new outfall.

Following installation and operation of the groundwater extraction wells, the chemical properties and

hydraulic behavior of the groundwater system will be monitored to verify the adequacy of the remedy.

## 5. STATUTORY DETERMINATION

The selected remedy is protective of human health and the environment. It complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action and is cost effective. This is a final action ROD.

This remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable for this site and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. While the remedy calls for treatment of contaminated groundwater, treatment of soil at the site was not found to be practicable. The fact that the source of contamination is diffuse and no substantive onsite soil hot spots. Exist precludes a remedy consisting of excavation and treatment of contaminants in soil.



Because this remedy may result in hazardous substances remaining onsite above health-based levels, a review will be conducted within 5 years after commencement of this remedial action and at 5-year intervals thereafter to ensure that the remedy continues to adequately protect human health and the environment.

## 6. STATE CONCURRENCE

The State of Ohio (Ohio Environmental Protection Agency [OEPA]) concurs with the selected remedy.
The Letter of Concurrence is attached to this ROD (Attachment A).

JUN 12 1995

<IMG SRC 0595292>

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Valdas V. Adamkus, Regional Administrator, U.S. Environmental Protection Agency, Region V Date

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J. Phil Hamric, Manager, Ohio Field Office, U.S. Department of Energy
Date



# DECISION SUMMARY

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# RECORD OF DECISION

## OPERABLE UNIT 1

## AREA B, MOUND PLANT, OHIO

## June 1996

## DECISION SUMMARY

### 1. SITE NAME, LOCATION, AND DESCRIPTION

The U.S. Department of Energy (DOE) Mound Plant Site (Figure 1) is located within the southern city limits of Miamisburg, in Southern Montgomery County, Ohio. The Site is approximately 10 miles south-southwest of Dayton and 45 miles north of Cincinnati. Miamisburg is predominantly a residential community with some supportive commercial facilities and limited industrial development. Much of the residential, commercial, and industrial development within a 5-mile radius of the Site is concentrated on the Great Miami River floodplain. The adjacent upland areas are used primarily for residences and agriculture or are unused open spaces.

Mound Golf Course and Miamisburg Mound State Memorial Park, both directly east of the facility across Mound Road, are heavily used during favorable weather. The park is the site of a 68-ft-high ancient Indian mound, located 380 ft east of the Mound Plant boundary. Other recreational areas within 1 mile of the facility include the Miamisburg municipal park and swimming pool (located immediately west of Mound Plant), Harmon Athletic Field, and Library Park. These areas are used extensively during the summer.

There are no large lakes within a 5-mile radius of the Site. Some vestiges of the old Miami-Erie Canal lie between the Conrail Railroad and the Dayton-Cincinnati Pike west of the site. This remnant of the old Miami-Erie Canal is designated as OU 4. The major water body in the vicinity of the Mound

Plant
is the Great Miami River. It is approximately 150 to 200 ft wide in this area.

Agricultural land within a 5-mile radial area around the Site is primarily used for corn and soybean
production and for livestock grazing.

According to 1990 census figures, the population of Miamisburg is 17,834, Dayton is 182,044, and Montgomery County is 573,809.



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The only historic landmark in the vicinity of Mound Plant is the Miamisburg Mound, an ancient Indian
mound located 280 ft east-southeast of Mound Plant in Miamisburg Mound State Memorial park. The mound - a symmetrical, conical earthwork 68 ft high and 800 ft in perimeter - is one of the largest
of its type. It is believed to be the sepulcher of a chief of the Adena culture of Mound Builders who
inhabited the Ohio region as early as 800 B.C.

OU 1 also includes the three plant production wells located along the southern plant boundary. An
extended discussion of OU 1 history, including waste disposal and construction activities, is provided
in the RI report (RIR).

The former waste disposal sites within OU 1 (the historic landfill and associated features) are concentrated within, beneath, and immediately adjacent to the current site sanitary landfill. These
waste disposal sites are the result of a long history of dumping, burning, moving, reworking, burying,
and partially removing wastes and placing them into the engineered structure (the Site sanitary landfill).
Currently, the area bounded by the overflow pond to the north, the paved roads to the west and south,
and the bunker area to the east can be considered a single entity. It is internally heterogeneous; not
all portions are contaminated. However, subdividing the area does not increase understanding of the
transport phenomena that are occurring, nor does it facilitate developing remedial alternatives.

## 2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

Mound Plant was established at its present location in 1948. Currently, the facility is operated by
EG&G Mound Applied Technologies for DOE as an integrated research, development, and production facility that supports the DOE weapons and energy programs. To reconfigure and consolidate the nuclear complex, DOE has decided to phase out the future defense mission. As a result, the

Mound
Site has been designated an environmental management site and the plant is in the process of being
converted into a commercial and industrial site.

OU 1, also identified as Area B, occupies approximately 4 acres in the southwestern portion of the
Mound Plant (Figure 2). OU 1 includes a historic landfill site that was used by the Mound Plant from
1948 to 1974. Plant waste materials that were disposed of in OU 1 included general trash and liquid
waste. Much of this waste was later relocated and encapsuled in a site sanitary landfill constructed
in 1977. An overflow pond was constructed at the same time, partially covering the historic landfill
site. After 1974, waste was no longer disposed of in OU 1. There are known releases of volatile
VOCs from OU 1 into the adjacent Buried Valley aquifer (BVA). In addition, tritium was detected in
water samples taken from wells in OU 1, although the concentration was below the drinking water
maximum contaminant level.



<IMG SCR 0595292C>

The Mound Plant Site was placed on the CERCLA NPL in 1989. The DOE signed a CERCLA Section
120 Federal Facility Agreement with the USEPA, effective October 1990. A similar tripartite agreement
was signed among the DOE, USEPA, and OEPA in 1993. The OU 1 RI/FS was conducted between
1991 and 1994 to identify the types, quantities, and locations of contaminants and to develop ways
of addressing the contamination problems.

## 3. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The FS and Proposed Plan for OU 1 were released to the public on 15 November 1994. These two
documents were made available in both the Administrative Record and in an information repository
maintained in the public reading room at the Miamisburg Senior Adult Center, 305 E. Central Avenue,
Miamisburg, Ohio 45343. The notice of availability for these two documents was published in the
Dayton Daily News on 2, 7, and 21 November, 5 and 19 December 1994; and 1, 15, and 25 January
1995; in the Dayton Weekly News on 11-18 November 1994; in the Miamisburg News on 2 and
30 November, 7, 14, and 28 December 1994 and 11 January 1995; and in the Dayton Suburban
News on 28 December 1994. Dayton Suburban News advertising for the FS and Proposed Plan was
available to 160,000 persons in 19 local communities. A public comment period was held from
15 November 1994 through 31 January 1995.

A public meeting was held on 8 December 1994, where representatives from the DOE, EG&G, USEPA,
OEPA, Ohio Department of Health, Agency for Toxic Substances and Disease Registry, and city of
Miamisburg answered questions about problems at the site and about the remedial alternatives under
consideration. During this meeting, members of the public questioned DOE's selection of the
preferred

remedy, collection, treatment, and disposal and requested additional time to review the Proposed Plan.
As a result, a 30-day extension period for public review of the Proposed Plan was requested of the
USEPA and OEPA. This extension was approved and the public review period was extended to 31 January 1995. Substantive comments were received on the Proposed Plan; a response to the comments received during this period is included in the Responsiveness Summary, which is part of this
ROD.

This Decision Summary presents the selected remedial action for OU 1 chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the NCP. The Responsiveness Summary discusses the involvement of the community during the RI/FS and remedy selection process and shows
that the public participation requirements of CERCLA Sections 113(k) (2) (B) (i-v) and 117 have been
met. The decision is based on the Administrative Record.



## 4. SCOPE AND ROLE OF OU

Because of the magnitude and complexity of the Mound Plant RI/FS, the Site has been divided into OUs
as a means of managing the investigation. OUs 1, 2, 4, 6, 6, and 9 generally divide the Mound Plant
Site into the geographic areas shown on Figure 2. These OUs and current objectives are as follows:

- Area B, OU 1, is the subject of this ROD. It occupies approximately 4 acres in the southwestern portion of the Mound Plant. OU 1 includes a historic landfill site that was used by the Mound Plant from 1948 to 1974. Plant waste materials that were disposed of in OU 1 included general trash and liquid waste. Much of this waste was later relocated and encapsuled in a site sanitary landfill constructed in 1977. An overflow pond was constructed at the same time, partially covering the historic landfill site. After 1974, waste was no longer disposed of in OU 1. There are known releases ot VOCs from OU 1 into the adjacent BVA. In addition, tritium has been detected in water samples taken from wells in OU 1, although the concentration was below the drinking water maximum contaminant level.

- Main Hill, OU 2, includes potential release sites on the Mound Plant Main Hill, including some peripheral groundwater seeps. The scope of investigation includes characterization of the indurated bedrock and unconsolidated overburden on the Main Hill, associated soils, and groundwater.

- Miami-Erie Canal, OU 4, addresses an abandoned segment of the Miami-Erie Canal west of Mound Plant that contains plutonium-contaminated sediment; (from a 1969 waste-

line
break) and tritium-contaminated soils. It is 1 mile long, and is considered to be one
potential release site.

- South Property, OU 5, includes soils with known or suspected radioactive contamination,
as well as the geographical area of the SM/PP Hill, the Plant Valley, and the New Property.
The sites within OU 5 are not currently scheduled for decontamination and
decommissioning (D&D) under the D&D Program at Mound Plant. It is anticipated that, as
sites obtain funding under the D&D Program, they may be moved from OU 5 to OU 6,
described below. As with the Main Hill, investigations of the potential source terms on the
SM/PP Hill may require characterization of the bedrock and unconsolidated overburden.

- D&D Program Sites, OU 6, includes potential release sites with radioactively contaminated
soils that are undergoing cleanup or are scheduled for cleanup in the near future. Because
it is already known that the contaminated soil will be cleaned up, and because the D&D
Program is an ongoing activity (under the Atomic Energy Act) that reduces potential
impacts to human health and the environment, the scope of the RI/FS for these sites is
verification of cleanup after the soil is removed. The cleanup levels are to be determined
through the CERCLA risk assessment process.

- Site-wide RI/FS, OU 9, includes off-plant migration of contaminants in groundwater, soils,
surface water and sediments, air, and flora and fauna. In addition, the Site-wide RI/FS will
ensure that a comprehensive investigation is performed by compiling all data from
individual OU investigations into a comprehensive report. Data reports from specific
site-wide investigations conducted under this work plan will be initially reported in interim
reports or technical memoranda to ensure that the off-plant and regional data are available
early.



OU 1 encompasses an historical waste disposal area (landfill) from which there have been known releases of VOCs to the BVA, a sole-source aquifer. The cleanup remedy for OU 1 is selected from
the alternatives discussed in the FS, which is available to the public for review. The contaminated
groundwater in OU 1 is a principal threat at this site because of the possible offsite migration of the
VOC-contaminated plume and the potential for direct ingestion of contaminants through drinking water

wells. The soil contaminants in OU 1 are restricted to the area of past disposal activity with no discernible source detected.

## 5. SITE CHARACTERISTICS

### 5.1. History of OU 1

Cut-and-fill activities and refuse and waste disposal have occurred within OU 1 from 1948 to 1974. However, no written manifests of the waste types and quantities exist, and uniform disposal practices were not followed.

Before 1947, OU 1 was a residential area with two or three small houses and storage buildings. During plant construction, the area was exploited for its gravel deposits. Removal of gravel was routine until 1977. The gravel pit, as well as the waste disposal features discussed below, are shown in Figure 3.

The old gravel excavation and the disturbed area just north of the excavation were used for landfill, including open burning of trash and garbage from plant operations. A burn cage, consisting of a wire mesh structure that caught ashes from burning wood, paper, and other materials, was used. Solid waste, mostly paper, office, end kitchen garbage, was placed in the burn cage and ignited to reduce its volume.

In 1954, the first burial in OU 1 occurred along the southern boundary of the old gravel quarry, just north of and parallel to the east-west road that climbs the SM/PP Hill. A backhoe was used to excavate an irregularly shaped trench to the maximum depth possible. Residual steel and metal debris (such as rebar and pipe), the result of a fire that consumed the Dayton Unit salvage materials on another part of the plant (now Area 13), were progressively buried in the trench. The debris and backfill were regraded to just below the road level.

During 1955 and possibly 1956, empty drums that had contained thorium were buried in the southwest corner of OU 1. A shallow excavation was made, and about 2,500 55-gallon drums were crushed and then covered with a thin layer (about 1 to 2 ft) of soil cover. The buried drums and backfill were regraded to just below the level of the road.



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In 1959, the state of Ohio banned open burning, and Mound Plant prohibited open burning of solid and liquid waste in OU 1. Hazardous liquid waste was collected and disposed of offsite. Solid waste was

placed in east-west-trending trenches cut by a bulldozer.

In 1977 and 1978, the overflow pond and site sanitary landfill were constructed on the site of OU 1. The overflow pond was built to complement the low-flow retention basins, which were constructed in 1976 on the lower reach of the plant drainage ditch. Much of the solid waste in the historic landfill was excavated and moved to the site sanitary landfill. Generally, debris from the Dayton Unit fire in the first trench and empty, crushed drums that had contained thorium in the second trench were not excavated and remained under the landfill. The volume excavated was limited by the volume required for the pond construction.

The pond was built with a natural clay-bearing compacted glacial till liner and earthen dikes. It has a 5,000,000-gallon capacity. Effluent in the overflow pond is discharged through a standpipe in the northwest corner of the pond to the stilling basin below the low-flow retention basins. It then goes to the Miami-Erie Canal and to the Great Miami River through NPDES Outfall 002 at a rate of approximately 660,000 gallons per day.

The site sanitary landfill was constructed with a 4- to 5-ft-thick clay liner consisting of onsite materials and a cap of 3 ft of clay with 2 to 5 ft of low-permeability topsoil. The clay liner was compacted to ensure a proper seal and integrity over time. A leachate collection system was constructed using collection drains at the top of the lower clay liner of the landfill. The drains located in the landfill allow any landfill liquids to move into the adjacent overflow pond. Five french drains were installed 2 to 25 ft below the landfill liner, partially in a fine gravel/sand layer and partially in a silty clay layer. These french drains drain moisture from under the site sanitary landfill to ensure soil slope stability.

A thin (< 2-ft-thick) layer of burned trash on the west side was excavated directly beneath the landfill site. Approximately 100,000 cubic yards of trash was moved from the overflow pond site to the landfill. According to personal accounts, some of the trash was saturated during excavation and the liquid flowed from the drain pipe into the pond for 6 months afterward. No known samples of this leachate were collected. No known drainage has occurred since the initial 6-month period. The height of the landfill was surveyed and checked for settling a year or two after construction. Although no known written report exists, a verbal report suggests little or no settling occurred.

Currently (1995), OU 1 remains much as it did in 1978 after the overflow pond and site sanitary landfill were constructed. The road along the north and west boundary has been paved and, in the 1980s, a bridge was built over the overflow channel from the plant drainage ditch to the overflow pond.

Numerous monitoring wells have been installed around OU 1 as par of area environmental investigations.

## 5.2. Geologic Setting

OU 1 is partially located on a buried bedrock shelf that drops off to the west, north, and south. The surface of the bedrock is a preglacial erosional surface that is weathered, but grades rapidly into competent material. The bedrock section subjacent to OU 1 is dominated shale with a significant limestone-bearing portion truncated by erosion immediately beneath the site sanitary landfill. The next nearest (vertically) significant limestone portion is approximately 30 ft lower in the section and does not intersect the bedrock interface until some distance to the west of OU 1, at or beyond the plant boundary. The opportunity for contaminant transport from OU 1 through limestone layers does not exist.

The bedrock is overlain by glacial outwash materials, glacial till, and artificial ill. The outwash materials that contain the BVA thin eastward against the Buried Valley margin, which is beneath the western edge of OU 1 adjacent to the waste disposal areas (site sanitary and historic landfills). Only the western portion of the site sanitary landfill overlies the BVA. The eastern portion overlies the bedrock shelf. To the north, these outwash materials extend up the Plant Valley. The portion of the BVA immediately adjacent to OU 1 (to the west) varies from 0 to 40 ft thick an is relatively free of fine-grained till layers within the outwash. Typical transmissivities are high (between 30,000 and 50,000 ft2/day).

## 5.3. Hydrologic Setting

Groundwater occurs primarily in the outwash sediments of the BVA or in its extension up the Plant Valley. Within the valley, gradients are steep and are governed by topography and the thickness of the unconsolidated zone; flow is west-southwest along the valley axis. In he main part of the BVA, to the west of OU 1, gradients are nearly flat; flow is generally south, governed by the interrelationships among recharge, river stage, and the pumping of the Mound Plant production wells. In the immediate vicinity of OU 1, flow is governed by the plant production wells and is southward toward the pumping well, Well 0076 (Figure 4). Well 0076 is the primary plant production well.

The waste materials and contaminated soils within OU 1 are partially isolated from the hydrologic environment. Much of the surface is engineered to provide rapid runoff. The materials immediately below the waste disposal area are dominantly fine-grained, which may inhibit the downward movement of water and contaminants. The water table is at or below the bedrock interface in this area, so the

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unconsolidated materials are also in the vadose zone. However, during periods of high seasonal groundwater, some waste materials or contaminated soil are exposed to circulating waters.

5.4. Contaminant Occurrence

Contaminated media at OU 1 include both soils and waste materials within the site and the groundwater system beneath and adjacent to the site. Chemicals of potential concern (COPC) from the Baseline Risk Assessment are identified in Table 1.

5.4.1. Soils

The only discernible pattern for all the compounds detected during the surface and subsurface soil sampling appears directly related to activities in and around the site sanitary landfill. A single major source of the contaminants has not been detected and is not believed to exit. Rather, it is believed that a random pattern of dispersed contamination is the source of the compounds. While not exceeding established regulation limits, tetrachloromethane is present at risk-based levels of concern (see section 6.3)

5.4.2. Groundwater

The recent groundwater sampling data (June 1992 through March 1993) identified five VOCs at levels above proposed or established regulatory limits (40 CFR 141 ) in the groundwater beneath OU 1. These VOCs are vinyl chloride (chloroethene), trichloromethane (chloroform), 1,2-cis-dichloroethene (DCE), TCE, and tetrachloroethene (PCE). Only one VOC, 1,1,1-trichloroethane (TCA), shows concentrations offsite; the pattern of occurrence suggests a source outside OU 1. The general area impacted by VOCs is indicated in Figure 4. Two metals (chromium and nickel) were detected above primary drinking water standards from December 1991 to March 1993. No consistent trend exists for concentrations of metals in the area.

## 6. SUMMARY OF SITE RISKS

Based on analytical data collected during the RI, a Baseline Risk Assessment was performed using site-related contaminants. The Baseline Risk Assessment assumes no corrective action will take place and that no site use restrictions or institutional controls, such as fencing, groundwater use restrictions, or construction restrictions, will be imposed. The risk assessment determines actual or potential carcinogenic risks and/or toxic effects that the contaminants at the site pose under current and future land use assumptions. Therefore, the assessment serves as a baseline case that can be used to

Table 1. Summary of COPCs

Groundwater

The organic COPCs for groundwater are:

| | |
|---|---|
| - 1,1,1 -TCA | 20/æg/L |
| - 1,2-cis-DCE | 640 (J) |
| - bis-(2-ethylhexyl)phthalate | 0.23 (J) |
| - chlordane (alpha) | 0.061 |
| - diethyl phthalate | 10 (J) |
| - pyrene | 10 (J) |
| - PCE | 290 (J) |
| - tetrachloromethane | 5.1 |
| - TCE | 160 |
| - trichloromethane | 130(J) |
| - trichlorofluoromethane | 12 |
| - vinyl chloride | 17 |

The radioactive COPCs (that exceeded background levels) are:

| | |
|---|---|
| - actinium-227 | 2.27 pCi/L |
| - plutonium-238 | 0.057 |
| - plutonium-239/240 | 0.263 |
| - strontium-90 | 0.766 |
| - tritium | 13,500 |
| - uranium-235 and -236 | 0.188 |
| - uranium 238 | 1.46 |

The following radionuclides were retained as groundwater COPCs because they are daughter products of the radionuclides that were found to exceed background levels:

- radium-226 2.61 pCi/L
- thorium-228 0.97 (J)
- thorium-230 3.86
- thorium-232 0.588 (J)
- uranium-234 0.782

Soil

The organic COPCs for soils are:

- 1,2,3,4,6,7,8-HpCDF 214 pg/g
- 1,2,3,4,6,7,8-HpCDD 259
- 1,2,3,4,7,8,9-HpCDF 41.4
- 1,2,3,4,7,8-HxCDD 8.5
- 1,2,3,4,7,8-HxCDF 209
- 1,2,3,5,7,8-HxCDF 63.2
- 1,2,3,6,7,8-HxCDD 28.3
- 1,2,3,7,8,9-HxCDD 39.7
- 1,2,3,7,8-PeCDF 43.2
- 2,3,4,6,7,8-HxCDF 64.1
- 2,3,4,7,8-PeCDF 150
- 2,3,7,8-TCDD 22.5
- 2,3,7,8-TCDF 132



Table 1. (page 2 of 2)

Soil (Continued)

- OCDD 2110
- OCDF 163
- 1,2-DCE 6,700/æg/kg
- 4-methyphenol 290
- aroclor-1248 220,000
- benzo(a)anthracene 3,400
- benzo pyrene 2,500
- benzo(k)fluoranthene 4,000
- benzo(k)fluoranthene 4,000
- benzoic acid 1,700
- bis(2-ethylhexyl)phthalate 5,600
- vinyl chloride 190
- chrysene 2,600
- dichloromethane 81
- fluoranthene 8,300
- indeno(1,2,3-cd)pyrene 1,200
- phenol 120 (J)

- pyrene 7,200 (J)
- PCE 24,000
- toluene 7,100
- TCE 970 (J)

inorganic COPCs consist of:

- fluoride 12.6 mg/kg
- nitrate 16.87
- silver 6.3

The radioactive COPCs (that exceeded background levels) are:

- plutonium-238 17.8 pCi/g
- plutonium-239/240 1.2
- strontium-90 5.78
- tritium 40.3

The following radionuclides were retained as soil COPCs because they are daughter products of the radionuclides that were found to exceed background levels:

- thorium-228 1.3 pCi/G
- thorium-232 1.04
- uranium-235/236 6.091 (J)

COPC - contaminants of potential concern
DCE - dichloroethene
(J) - estimated quantity
mg/kg - milligram per kilogram
æg/kg - microgram per kilogram
PCE - tetrachloroethene
pCi/g - picocuries per gram
pCi/L - picocuries per liter
pg/g - picogram per gram
TCA - trichloroethane
TCE - trichloroethene
- contaminant contributing significant risk



compare the relative effectiveness of alternative remedial strategies in reducing public health risks.
This Baseline Risk Assessment focuses on exposure of hypothetical future workers or residents to soil and groundwater contamination.

The Baseline Risk Assessment estimates risk associated with potential pathways identified by the conceptual site model presented in Figure 5. It also identifies pathways that exceed acceptable risk, so that the remediation process is focused on pathways that present a threat to human health and the environment.

## 6.1. Contaminant Identification

The levels of contamination found in the different media at the Site are reported in the RIR. Identification of contaminants of potential concern (COPCs) is presented in Section 5 of the RIR. The COPCs were listed in Table 1. As discussed in section 6.4 below, the list of COPCs was reduced to only those contaminants that contribute significantly to the risk. These are highlighted in Table 1.

## 6.2. Exposure Assessment

The objective of the exposure assessment is to estimate the type and magnitude of exposures to COPCs that are present at or migrating from Area B. The exposure pathway is the mechanism by which an individual or population is exposed to chemicals at or originating from a site. Each exposure pathway requires a source or release from a source, an exposure point, and an exposure route.

### 6.2.1. Exposure Setting

The exposure setting, which includes Area B climate, vegetation, groundwater hydrology, and other characteristics, is described in detail in the RIR. The nearest populations are less than 750 ft west of OU 1, within the city of Miamisburg. The 1990 census gives the population of Miamisburg as 17,834, Dayton as 182,O44, and Montgomery County as 573,809. Miamisburg is predominately a residential community, with some supportive commercial facilities and limited industrial and agricultural development.

Most of the residential, commercial, and industrial development within a 5-mile radius of the site is concentrated on the Great Miami River floodplain. The adjacent upland areas are used primarily for residences and agriculture or are unused open spaces. Agricultural land within a 5-mile radius of the site is primarily used for corn and soybean production and livestock grazing.



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The major water body in the vicinity of OU 1 is the Great Miami River. It is approximately 150 to 200 ft wide in this area. The river is used for pleasure boating and sport fishing, primarily during the summer. Swimming is not permitted in the river.

### 6.2.2. Characterization of Exposure Pathways

OU 1 is located within a government-owned and restricted facility. Unrestricted access and development of the site is possible only if DOE releases the property. No one presently lives on or otherwise uses the property; current workers do not work on a continual basis within Area B.

Three OU 1 production wells supply or have supplied water to the Mound Plant. One well, production well 0071, is no longer in use because volatile organic contaminants were detected at concentrations exceeding USEPA maximum contaminant levels (MCLs) and Ohio drinking water standards. The other two wells, production wells 0076 and 0271, are still in use and have organic concentrations below EPA MCLs and Ohio drinking water standards. Since Mound Plant is taking water from OU 1 that meets acceptable drinking water standards, a current worker scenario was not considered for the Baseline Risk Assessment.

The Baseline Risk Assessment involves 1) the determination of contaminant concentrations at exposure points for a future resident farmer scenario and future indoor and outdoor industrial park worker scenarios, and 2) the estimation of contaminant intake through potential exposure pathways.

Two types of exposures were evaluated for the future farmer resident scenario. These exposure types are denoted as the reasonable maximum exposure (RME) and the central tendency exposure (CTE). The RME is defined as a "reasonable worst case" that is conservatively high, yet still has a reasonable likelihood of occurring. Key features of an RME are that one would expect at least 90 percent of actual exposures to be lower and that it could occur. The CTE, on the other hand, is an "average case." Fifty percent of actual exposures are expected to be lower or higher than the CTE. High exposures will typically fall between the CTE and the RME.

The exposure scenario for the future farmer resident includes all potential pathways identified in the site conceptual model that could lead to quantifiable exposure. The farmer is assumed to be exposed through the following routes:

- Ingestion of groundwater.
- Incidental ingestion of and dermal contact with surface water while swimming.



- Dermal contact and inhalation of VOCs while showering with groundwater.
- Inhalation of resuspended dust while plowing/cultivating crops and garden produce and under usual dust resuspension conditions.
- Incidental ingestion of soil.
- External exposure to radiation emitted from radionuclides in soil.
- Dermal contact with chemicals in soil.
- Ingestion of homegrown produce grown in contaminated soil.

- Ingestion of livestock that have ingested contaminated soil and contaminated plants.

It is assumed that the future onsite industrial park worker will work within the Area B location for 25 years (RME). For the CTE, it is assumed that the worker will be employed on the site for 9 years (assumed equal to residential). As with the future farmer resident, the source of water for the industrial park comes from contaminated onsite wells that workers use for showering at the end of the workday.

In the future indoor industrial worker scenario, it is assumed that the worker performs job duties within a structure or building for 8 hours a day, 250 days a year. The indoor worker is assumed to be exposed through the following routes:

- Ingestion of groundwater.
- Inhalation of indoor vapors.
- Inhalation of indoor particulates.
- Inhalation of VOCs while showering with groundwater.
- Dermal contact with contaminants while showering with groundwater.

For the future outdoor industrial worker scenario, the following exposure routes were evaluated:

- Ingestion of groundwater.
- Inhalation of outdoor particulates and vapors.
- Ingestion of soil.
- Dermal contact with chemicals in soil.
- Inhalation of VOCs while showering with groundwater.
- Dermal contact with chemicals while showering with groundwater.



## 6.3. Toxicity Assessment

The purposes of the toxicity assessment are to weigh available evidence regarding the potential for particular contaminants to cause adverse effects in exposed individuals and to provide an estimate of the relationship between the extent of exposure to a contaminant and the increased likelihood and/or severity of adverse effects. This includes the preparation of fate and toxicity profiles for each of the

chemicals and identification of human health criteria. The sources of toxicity data include the Integrated Risk Information System (IRIS), the Health Effects Assessment Summary Tables (HEAST), the USEPA Environmental Criteria and Assessment Office (ECAO), and USEPA Region III.

6.3.1. Toxicity for Noncarcinogenic Effects

The USEPA Office of Research and Development has calculated acceptable intake values, denoted as reference doses (RfDs) or reference concentrations (RfCs), for long-term (chronic) exposure to noncarcinogens. The most recent oral RfDs and inhalation RfCs of the COCs and the associated sources are summarized in Table 2.

6.3.2. Toxicity for Carcinogenic Effects

For chemical carcinogens, the EPA Office of Research and Development has calculated estimates of the carcinogenic potential. These estimates, or slope factors, correlate intake of a carcinogen with an
increased risk of cancer. The most recent oral and inhalation slope factors from IRIS, HEAST, USEPA,
and ECAO, along with evidence and slope factor sources for COCs, are summarized in Table 3.

The USEPA currently classifies all radionuclides as Group A, known human carcinogens. The ingestion,
inhalation, and ground exposure slope factors for the various radionuclides of concern at Mound Plant
are summarized in Table 4.

6.4. Risk Characterization

In this section, toxicity and exposure assessment are summarized and integrated into quantitative
expressions of risk. Both noncarcinogenic and carcinogenic effects are evaluated.

6.4.1. Carcinogenic Risk Characterization - Future Resident Farmer Scenario

For potential carcinogenic risks, the probability that an individual will develop cancer over a lifetime
of exposure is estimated from daily intakes and dose response information (carcinogen potency



Table 2. Toxicity Values - Potential Noncarcinogenic Effects

| Chemical | Chronic Ingestion RfD (mg/kg/day) | RfD Source | Chronic Inhalation Rf (mg/m3) | RfC Source |
|---|---|---|---|---|
| Organic Chemicals | | | | |
| 1,2-cis-Dichloroethene .... | 1.OE-02 | HEAST | -- | -- |
| 1,2-Dichloroethane | -- | ECAO | 1.0E-02 | -- |
| 2,3,7,8-TCDD (Dioxins) ..... | -- | -- | -- | -- |

Archior-1248 (PCB) .....
--
--
--
Benzo(a)pyrene .....
--
--
--
Chlordane (alpha) ....
--
6.0E-05
IRIS
Tetrachloroethene (PCE) ....
--
1.0E-02
IRIS
Tetrachloromethane
2.0E-03
ECAO
7.0E-04
IRIS
Trichloroethene ....
--
6.0E-03
ECAO
Trichlormethane ....
--
1.0E-02
IRIS
Vinyl chloride .....
--
--
--

ECAO - USEPA Environmental Criteria and Assessment Office
IRIS - Integrated Risk Information System
HEAST - Health Effects Assessment Summary Tables
mg/kg/day - milligrams per kilogram per day
mg/m3 - milligrams per cubic meter
RfC - reference concentration
RfD - reference dose



Table 3. Toxicity Values - Potential Carcinogenic Effects

| Chemical | USEPA Weight of Evidence | Inhalation Slope Factor Ingestion Slope Factor (1/mg/kg/day) | Inhalation Slope Factor Source | Inhalation Slope Factor Ingestion Slope (1/æg/m3) | Inhalation Slope Factor Source |
|---|---|---|---|---|---|
| Organic Chemicals | | | | | |
| 1,2-cis-Dichloroethene | D | -- | -- | -- | -- |
| 1,2,Dichloroethene | B2 | 9.1E-02 | IRIS | 2.6E-05 | IRIS |
| 2,3,7,8-TCDD (Dioxins) | B2 | 1.5E +05 | HEAST | 3.3E-11 | HEAST |
| Aroclor-1248 (PCB) | B2 | 7.7E +00 | IRIS | -- | -- |
| Benzo(a)pyrene | B2 | 7.3E +00 | IRIS | 1.7E-03 | HEAST |
| Chlordane (alpha) | B2 | 1.3E +00 | IRIS | 3.7E-04 | IRIS |
| Tetrachloroethene (PCE) | NA | 5.2E-02 | ECAO | 5.8E-07 | ECAO |
| Tetrachloromethane | B2 | 1.3E-01 | IRIS | 1.5E-05 | IRIS |
| Trichloroethene | NA | 1.1E-02 | ECAO | 1.7E-06 | ECAO |
| Trichloromethane | B2 | 6.1E-03 | IRIS | 2.3E-05 | IRIS |
| Vinyl chloride | A | | | 8.4E-05 | |

HEAST 1.9E +00 HEAST

aKey:

A = Known human carcinogen
B1 = Probable human carcinogen, limited human data
B2 = Probable human carcinogen, inadequate or no human data
C = Possible human carcinogen
D = Not classifiable as human carcinogen
E = Evidence that not carcinogenic in humans

ECAO - USEPA Environmental Criteria and Assessment Office
HEAST - Health Effects Assessment Summary Tables
IRIS - Integrated Risk Information System
pg/m3 - micrograms per cubic meter
mg/kg/day - milligrams per kilogram per day
NA - Weight of evidence information not available
USEPA - U.S. Environmental Protection Agency



Table 4. Slope Factors for Radionuclides of Concern at Mound Plant

| Radionuclides | Ingestion (Risk/pCi) | Inhalation (Risk/pCi) | Ground Surface (Risk/year per pCi/g) |
|---|---|---|---|
| Actinium-227 + D | 3.5E-10 | 8.8E-08 | 8.5E-07 |
| Plutonium-238 | 2.2E-10 | 3.9E-08 | 2.8E-11 |
| Plutonium-239 | 2.3E-10 | 3.8E-08 | 1.7E-11 |
| Plutonium-240 | 2.3E-10 | 3.8E-08 | 2.7E-11 |
| Radium-226 + D | 1.2E-10 | 3.0E-09 | 6.0E-O6 |
| Strontium-90 + D | 3.6E-11 | 6.2E-11 | 0.0E + 00 |
| Tritium | 5.4E-14 | 7.8E-14 | 0.0E + 00 |

aAll radionuclides have an A (known human carcinogen) weight of evidence classification.

D - daughter
pCi - picocuries
pCi/g - picocuries per gram

factors). Carcinogenic risk depends on three factors: the dose, the carcinogenic potency of the chemical or radionuclide, and the exposure duration. To calculate carcinogenic risk, the products of the individual chemical exposures and carcinogenic slope factors were summed to provide the estimated risk to the future resident.

Future resident farmer RME carcinogenic risks to the child and adult from all chemicals, radionuclides, and pathways are 2 excess cancers per 10,000 persons exposed and 5 excess cancers per 10,O00 persons exposed, respectively. The overall CTE carcinogenic risks to the child and adult are 4 excess cancers per 100,000 persons exposed and 1 excess cancer per 10,000 persons exposed, respectively.

For the future resident farmer scenario, the ingestion and inhalation pathways contribute more than 80 percent of the carcinogenic risk. The remainder of the carcinogenic risk is attributable to dermal contact. The overall carcinogenic risk due to external radiation exposure is less than lx10-7.

The overall carcinogenic risks posed by groundwater are 6x10-4 and 1x10-4 for the RME and CTE, respectively. The overall risks (RME and CTE) Posed by soil COPCs are more than one order of magnitude less than those for groundwater.

6.4.2. Carcinogenic Risk Characterization - Future indoor Industrial Park Worker Scenario

For the future onsite indoor worker, the overall RME and CTE risks were found to be 2x10-4 and 5x10-5, respectively (does not include daughter product radionuclides). PCE had the highest RME risk of 8x10-5. Groundwater COPCs contribute virtually all of the carcinogenic risk (greater than 99 percent). The soil RME and CTE risk levels are less than the lowerbound value of the USEPA target risk range.

6.4.3. Carcinooenic Risk Characterization - Future Outdoor Industrial Park Worker Scenario

For the future onsite outdoor worker, the overall RME and CTE risks were found to be 1x10-4 and 2x10-5, respectively (does not include daughter product radionuclides). The ingestion and dermal contact pathways contribute approximately 83 percent of the carcinogenic risk. PCE had the highest RME risk of 7x10-5. Groundwater COPCs contribute the majority (approximately 95 percent) of the overall RME and CTE carcinogenic risks.



6.4.4. Noncarcinogenic Risk Characterization - Future Resident Farmer Scenario

Noncarcinogenic risk was evaluated by calculating the hazard quotient (HQ), which is the ratio of the

estimated daily exposure of each contaminant, to the applicable chronic RfC or RfD for that contaminant. The HQs were then summed to derive a hazard index (HI) for each exposure route and for all exposures combined. All RME and CTE noncarcinogenic HQs and HIs from all pathways are presented in the RIR.

An HI of greater than 1.0 at any time during an individual's lifetime indicates that there may be a potential for noncarcinogenic effects. The overall RME His for the child and adult in the future farmer scenario are 21 and 18, respectively. For the future farmer CTE, the overall HIs are 12 for the child and 11 for the adult.

For the future farmer scenario, the inhalation pathway contributes to approximately 80 percent of the overall noncarcinogenic risk. Tetrachloromethane, TCE, and PCE were the only COPCs with overall RME His exceeding unity. These COPCs contributed to approximately 90 percent of the overall noncarcinogenic risk. Tetrachloromethane had the highest overall RME a d CTE HI of 31 and 20, respectively.

Groundwater COPCs contribute virtually all of the noncarcinogenic risk (greater than 99 percent). The soil RME and CTE His are two orders of magnitude less than unity.

6.4.5. Noncarcinogenic Risk Characterization - Future Indoor Industrial Par Worker Scenario

For the future indoor industrial park worker scenario, the overall RME and CTE His were 17 and 11, respectively. The inhalation pathway contributes approximately 96 percent of the overall noncarcinogenic risk. Tetrachloromethane had the highest RME and CTE HIs of approximately 15 and 10, respectively.

Tetrachloromethane was the only COPC with RME and CTE HIs that exceeded unity. The overall RME and CTE His, with the exception of tetrachloromethane, were found to be below unity. The groundwater COPC His contributed almost 100 percent of the noncarcinogenic risk. The soil COPC HIs were approximately 10 orders of magnitude less than unity.



6.4.6. Noncarcinogenic Risk Characterization - Future Outdoor industrial Park Worker Scenario

For the future outdoor industrial park worker scenario, the overall RME and CTE HIs were 15 and 9, respectively. The inhalation pathway contributes approximately 95 percent of the overall noncarcinogenic risk. Tetrachloromethane had the highest RME and CTE HIs of approximately 14 and 9, respectively.

Tetrachloromethane was the only COPC with RME and CTE HIs that exceeded unity. The overall RME and CTE HIs, with the exception of tetrachloromethane, were found to be below unity.

The groundwater COPC HIs contributed almost 100 percent of the noncarcinogenic risk. The soil COPC HIs were approximately three to four orders of magnitude less than unity.

6.4.7. Risk Characterization

Tables 5 and 6 present the range of potential carcinogenic and noncarcinogenic risks associated with
Area B, respectively. The lowerbound values represent CTE values, while the upperbound values represent RME values. These ranges indicate the uncertainties associated with Area B risks and provide information on the sensitivity of each exposure scenario to the values of its numerical parameters.

6.5. Summary

The risk assessment performed for OU 1, Area B, has provided estimates of potential relative risk for
the future farmer resident and for future worker exposure to groundwater and soils. The scenarios that
were developed are conservative and hypothetical; relative risks determined for these can be interpreted more accurately by considering the assumptions in the calculations.

For the future farmer resident, the total RME carcinogenic risks to the child and adult from all chemicals, radionuclides, and pathways are 2 and 5 excess cancers in 10,000 persons exposed, respectively. The combined overall RME adult and child risk may be of potential concern because it
lies outside the upperbound value of the EPA target carcinogenic risk range of lx10-6 to 1 x10-4. The
majority of the carcinogenic risk comes from PCE and trichloromethane.

Radium-226 and thorium-228 were the only daughter product radionuclides with RME carcinogenic risks that exceed 1x10-6 for the future farmer resident. The RME carcinogenic risk for thorium-228
was found to be 1x10-4 in soil, which is higher than the risks for all other chemicals and radionuclides



Table 5. Carcinogenic Risk Characterization Summary Table

| | Carcinogenic Risk Range (Lowerbound Value = CTE, Upperbound Value = RME) | | |
|---|---|---|---|
| | Future Farmer Resident (Adult + Child) | Future Indoor Industrial Park Worker | Future Outdoor Industrial Park Chemical Worker |
| Organic Chemicals | | | |
| 1,2-Dichloroethane | 8E-07 - 3E-06 | 3E-07 - 2E-06 | 7E-08 - 4E-07 |
| 2,3,7,8-TCDD (Dioxins) | 2E-06 - 8E-06 | 4E-22 - 2E-21 | 3E-O7 - 2E-06 |
| Aroclor-1248 (PCB) | 7E-O7 - 5E-06 | ..... | 9E-O8 - 8E-07 |
| Benzo(a)pyrene | 2E-06 - 1E-O5 | 3E-10 - 1E-O9 | 2E-O7 - 2E-06 |
| Chlordane (alpha) | 3E-O6 - 2E-05 | 9E-07 - 4E-O6 | 4E-07 - 2E-06 |

| | | |
|---|---|---|
| Tetrachloroethene | 6E-05 - 3E-04 | 2E-05 - 8E-05 |
| 1E-05 - 7E-05 | | |
| Tetrachloromethane | 5E-06 - 2E-05 | 2E-06 - 8E-06 |
| 6E-07 - 3E-06 | | |
| Trichloroethene | 9E-O6 - 4E-05 | 4E-06 - 2E-05 |
| 1E-06 - 5E-O | | |
| Trichloromethane | 4E-O5 - 1E-O4 | 2E-05 - 7E-O5 |
| 2E-O6 - 1E-05 | | |
| Vinyl chloride | 2E-O5 - 8E-05 | 6E-O6 - 3E-O5 |
| 2E-06 - 1E-05 | | |
| Radionuclides | | |
| Actinium-227 | 3E-O6 - 2E-05 | 9E-07 - 5E-06 |
| 9E-07 - 5E-06 | | |
| Plutonium-238 | 2E-06 - 7E-06 | 5E-07 - 2E-O6 |
| 5E-07 - 2E-06 | | |
| Plutonium-239/240 | 2E-06 - 1E-05 | 7E-07 - 4E-O6 |
| 7E-O7 - 4E-06 | | |
| Strontium-90 | 2E-06 - 1E-05 | 4E-O8 - 2E-07 |
| 4E-08 - 2E-07 | | |
| Tritium | 2E-06 - 1E-05 | 5E-07 - 3E-06 |
| 5E-07 - 3E-06 | | |

CTE - central tendency exposure
RME - reasonable maximum exposure
TCDD - tetrachlorodibenzo-p-dioxin



Table 6. Noncarcinogenic Risk Characterization Summary Table

| | Noncarcinogenic Hazard Index Range (Lowerbound Value = CTE, Upperbound Value = RME) | |
|---|---|---|
| Chemical | Future Farmer Resident (Adult + Child) | Future Indoor Industrial Park Worker |
| Future Outdoor Industrial Park Worker | | |
| Organic Chemicals | | |
| 1,2-cis-Dichloroethene | 5.3E-01 - 1.1E+00 | 5.5E-02 - 1.0E-01 |
| 5.5E-02 - 1.0E-01 | | |
| 1,2-Dichloroethane | 5.2E-01 - 8.2E-01 | 2.6E-01 - 4.1E-01 |
| 2.2E-01 - 3.7E-01 | | |
| Chlordane (alpha) | 2.3E-01 - 1.4E+00 | 3.7E-02 - 5.7E-02 |
| 3.7E-02 - 5.7E-02 | | |
| Tetrachloroethene | 1.4E+00 - 3.0E+00 | 2.1E-01 - 3.5E-01 |
| 2.1E.01 - 3.5E-01 | | |
| Tetrachloromethane | 2.OE+01 - 3.1E+01 | 9.9E+00 - 1.5E+01 |

| | | | |
|---|---|---|---|
| 8.6E+00 - 1.4E+01 | | | |
| Trichloroethene | 5.6E-01 - 1.1E+00 | 6.8E-02 - 1.2E-01 | 6.8E-02 - 1.2E-01 |
| Trichloromethane | 1.2E-01 - 2.4E-01 | 1.3E-02 - 2.5E-02 | 1.3E-02 - 2.5E-02 |

CTE - central tendency exposure
RME - reasonable maximum exposure



detected in soil. However, thorium-228 was detected at concentrate on levels equivalent to background.

HIs that exceed unity indicate that the chemical may cause adverse health effects to exposed individuals. As a rule, the greater a chemical HI exceeds unity, the greater the level of potential concern. For the future onsite resident scenario, tetrachloromethane and PCE pose the most significant noncarcinogenic risks, with overall RME HIs 3 to 31 times greater than unity. Since the sum of all COPC RME and CTE HIs are 24 to 39 times greater than unity, exposure to all COPCs could produce adverse health effects for the potential future residential farmer.

For the future indoor industrial park worker, the overall probability of cancer occurrence was 2 excess cancers in 10,000 persons exposed (RME) and 5 excess cancers in 100,000 persons exposed (CTE). PCE, chlordane (alpha), 1,2-dichloroethane, tetrachloromethane, trichloromethane, vinyl chloride, TCE, actinium-227, plutonium-238, plutonium-239/240, and tritium had RME risk levels exceeding 1x10-6. The majority of carcinogenic risk contribution is from PCE and trichloromethane. The overall indoor worker RME risk may be of potential concern because it exceeds the USEPA target risk range of 1x10-6 to 1x10-4.

For the future outdoor industrial park worker, the overall probability of cancer occurrence was I excess cancer in 10,000 persons exposed (RME) and 2 excess cancers in 100,000 persons exposed (CTE). PCE contributes more than half of the carcinogenic risk. The overall outdoor worker RME risk may be of potential concern because it lies at the upperbound limit of the USEPA target risk range.

Thorium-228 was the only daughter product radionuclide with RME and CTE carcinogenic risks that exceeded 1x10-6 for both the future indoor and outdoor workers. The future indoor and outdoor worker RME carcinogenic risks for thorium-228 were both found to be 2x10-5 in soil; these risk levels are significantly higher than the risks for all other chemicals and radionuclides detected in soil. However, thorium-228 was detected at concentration levels equivalent to background.

Tetrachloromethane is the only COPC that had RME and CTE HIs exceeding unity for both the future indoor and outdoor industrial park worker scenarios. Without tetrachloromethane, the overall RME and
CTE HIs are approximately equal to or less than unity for the future indoor and outdoor workers.

The risks to future indoor and outdoor workers are based on chemical and radionuclide concentrations
in groundwater and soil within and directly adjacent to the sanitary landfill in Area B. The future
worker scenarios assume that exposures take place within Area B and that the drinking and domestic
water supply is exclusively from Area B.



The contaminants of concern (COCs) that are the focus of remedial action efforts are defined as COPCs with either risks that exceed the minimum acceptable levels or risks that provide a significant
contribution to the overall risk in any one of the exposure scenarios. A COPC provides a significant
contribution to the overall risk if its hazard index exceeds 0.1 or its carcinogenic risk exceeds 1 x10-6.
Based on these criteria, the COCs delineated by the OU 1, Area B, risk assessment for the resident
scenario are the following:

- For groundwater:
  - 1,2-Dichloroethane.
  - 1,2-cis-DCE.
  - Benzo(b)fluoranthene.
  - Chlordane (alpha).
  - PCE.
  - Tetrachloromethane.
  - TCE.
  - Trichloromethane.
  - Vinyl chloride.
  - Actinium-227.
  - Plutonium-238.
  - Plutonium-239/240.
  - Radium-226.
  - Tritium.
- For soil:
  - 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) (dioxins).
  - Aroclor-1248 polychlorinated biphenyl (PCB).
  - Benzo(a)pyrene.
  - Plutonium-238.
  - Strontium-90.

## 6.6. Additional Considerations

### 6.6.1. Ecological Risk

An evaluation of the potential ecological impacts of OU 1 was not conducted. The ecological risk assessment will be performed on a site-wide basis during the OU 9 Site-Wide RI. The Mound Plant ecological risk assessment will be performed in conjunction with the site-wide ecological assessment.
The site-wide ecological risk assessment will be based on data collected as part of the OU 9 RI, along with the information obtained from the site-wide ecological assessment and other studies that have evaluated ecological conditions around the Mound Plant facility. The issue of ecological impacts will be addressed in the final determination for the site as a whole.



6.6.2. Immediate Points of Exposure

The most immediate point of exposure for contaminants originating in OU 1 also lies within the confines of OU 1 -the system of plant production wells. Production well was taken offline due to increasing levels of VOCs in the discharge water. Production well 3 is now the primary source of process and potable water for the plant. Production well 2 is pumped as required to provide a supplemental source of plant water,

6.7. Risk Assessment for the Selected Industrial Future Use Scenario

The preceding sections discussed the Baseline Risk Assessment-that is, a measure of the risks posed by the site if no remediation took place. To select a remedy, a realistic future use scenario was determined to help define cleanup goals. It has been agreed among the USEPA, OEPA, and DOE that the appropriate land use for OU 1 is industrial. Offsite, the appropriate lard use remains residential.
Thus, the context for onsite soil remediation is that of an industrial park, with no onsite groundwater use or standards. By the same token, the offsite contamination (limited to he groundwater pathway) must be protected to residential use standards. The point of compliance is established outside the roadways that bound the former waste disposal areas to the south and west. The assessment of risk expected under this future use scenario is discussed below.

The risk assessment for OU 1 addressed future public health risks, defining the performance requirements that remedial actions would meet. The conceptual pathway model is shown in Figure 5.
This risk assessment focused on the exposure of hypothetical future site workers to soil contamination through inhalation, incidental ingestion, external exposure to radiation emitted from radionuclides in soil, or dermal contact with the soil by an onsite industrial worker.

The results of the risk assessment of the future outdoor worker show tha two of the COPCs were found to have RME lifetime excess cancer-risks above 1x10-6. 2,3,7,8-TCDD and benzo(a)pyrene

each
had an estimated excess cancer risk of 2x10-6. The combined carcinogenic risk is 4x10-6. Because
the NCP specifies a target cancer risk range of 1x10-4 to 1 x10-6, and because this risk is already near
the lower end of this range, the soil pathway does not need further consideration. For noncarcinogens,
the HI was less than one for soil, indicating that noncarcinogenic health effects are not of concern.

The risk assessment also evaluated risks associated with future potential offsite residential use of
groundwater. The risks could result from direct exposure to contaminants by groundwater ingestion,
ingestion of groundwater-irrigated produce, and dermal contact and if inhalation of VOCs while showering with groundwater. The analysis dealt with all the COCs. Results of the analysis are shown
in Table 7.



Table 7. Summary of Risk for OU 1 (Soil and Groundwater) and Contaminants with Greatest Risk Contribution

| Groundwater COC with Greatest Effect | Overall Risk COC Effect RME | CTE | Percent of Exposure Due to Ingestion and Inhalation | Percent of Risk via Pathways |
|---|---|---|---|---|
| RME CTE | | | | |
| Carcinogenic Risk | | | | |
| Resident Farmer or Residenta | | | 83 | 96 |
| Tetrachloroethene (Adult + Child) | 2 x 10-4 (Adult + Child) | 6 x 10-5 | | |
| Adult | 5 x 10-4 | 1 x 10-4 | | |
| Trichloromethane (Adult + Child) | 1 x 10-4 (Adult + Child) | 4 x 10-5 | | |
| Child | 1 x 10-4 | 3 x 10-5 | | |
| Industrial Worker | 2 x 10-4 | 5 x 10-5 | 80 | 100 |
| Tetrachloroethene (Indoor) | 8 x 10-5 | 2 x 10-5 | | |
| Trichloromethane | 7 x 10-5 | 2 x 10-5 | | |
| Industrial Worker | 1 x 10-4 | 2 x 10-5 | 83 | 95 |
| Tetrachloroethene (Outdoor) | 7 x 10-5 | 1 x 10-6 | (Inhalation and Dermal) | |

Noncarcinogenic HI

| | | | | |
|---|---|---|---|---|
| Resident Farmer or Tetrachloromethane Residentb (Adult + Child) | 31 | 20 | 96 | 100 |
| Adult | 17 | 11 | | |
| Child | 19 | 12 | | |
| Industrial Worker | 16 | 10 | 98 | 100 |
| Tetrachloromethane (Indoor) | 15 | 10 | | |
| Industrial Worker | 15 | 9 | 95 | 100 |
| Tetrachloromethane (Outdoor) | 14 | 9 | (Inhalation) | |

aAlthough the resident farmer scenario includes more exposure pathways than the resident these pathways collectively contribute less than O.5%
additional risk for carcinogens.
bAdditional pathways for resident farmer collectively contribute less than 0.1% additional risk for noncarcinogens.

COC - contaminant of concern
CTE - central tendency exposure
HI - hazard index
RME - reasonable maximum exposure



Ingestion/inhalation contribute almost all of the risk; groundwater is the host important exposure medium (90 to 100 percent of each category). PCE had the highest overall carcinogenic risk in each exposure scenario; tetrachloromethane had the highest noncarcinogenic HI 80 to 90 percent of the contribution in each category). Because groundwater would contribute most of the carcinogenic and noncarcinogenic risks, it is the focus of the remedial efforts.

## 6.8. Remedial Action Objectives

Remedial action objectives are descriptions of how the remedial actions will protect human health and the environment and achieve the remediation goals.

### 6.8.1. Soils

To protect human health, the remedial action objective will be to prevent or reduce infiltration and migration of contaminants that would result in groundwater contamination in excess of remediation goals. Additionally, soil contaminants should not lead to an aggregate excess cancer risk

greater than
1x10-5 or an HI greater than one for occupational exposures.

6.8.2. Groundwater

To protect human health, the remedial action objective will be to prevent ingestion of water with
contaminant concentrations in excess of remediation goals (1x10-4 aggregate cancer risk for chemical
risk and radiological risk combined). To protect environmental health, the objective will be to control
or reduce (to remediation goals) the contaminant concentrations in the aquifer adjacent to OU 1. The
preliminary remediation goals for the groundwater medium are shown in Table 8. This will prevent
contaminant movement into the BVA and ensure that the BVA remains a safe drinking water source.
The specific cleanup level of each contaminant is based on federal primary drinking water standards
(40 CFR 141) and the limits of analytical capability to measure, as discussed in the FS. The point of
compliance for groundwater is outside (south and west) of the road bounding the site sanitary landfill,
as identified in 2 May 1994 correspondence (Attachment B).

## 7. DESCRIPTION OF ALTERNATIVES

The alternatives analyzed for OU 1 are discussed below. Detailed descriptions of the alternatives are
provided in the OU 1 FS.



Table 8. Preliminary Remediation Goals

| Constituent | Risk-base PRGa (æg/L} | Proposed PRG (æg/L) | SDWA MCL (æg/L) | Ohio Drinking Water Rule (æg/L) | Maximum Concentrationb (æg/L) | Quantitation Limit (æ/g/L) | Estimated Lifetime Risk at Proposed PRG |
|---|---|---|---|---|---|---|---|
| Actinium-227c | 0.1 | | NLd | NL | 1.6 | 0.2 | 2 2 x 10-5 |
| Chlordane(alphe) | 0.06 | | 2 | NL | ND | 0.06 | 0.06 1 x 10-6 |
| 1,2-Dichlorosthane | 0.1 | | NL | NL | ND | 0.3 | 0.1 1 x 10-6 |
| 1,2-c/s-Dichloroethene | 60 | | 70 | NL | 12 | 1.0 | 60 HQ = 1 |
| Plutonium-238c | 0.2 | | 15e | NL | 0.0536 | 0.2 | 0.2 1 x 10-6 |
| Plutortium-239/240c | 0.2 | | 15e | NL | 0.317 | 0.2 | 0.6 3 x 10-6 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tetrachloroethene | 1 | 5 | NL | 2.5 | 0.3 | 5 | 5 x 10-6 |
| Tetrachloromethane | 0.2 | 5 | 5 | ND | 1.2 | 0.2 | 1 x 10-6 |
| Trichloroethene | 2 | 5 | 5 | ND | 1.2 | 2 | 1 x 10-6 |
| Trichlorornethane | 0.2 | 100 | 100 | 14 | 0.5 | 2 | 1 x 10-5 |
| Tritiumc | 900 | 20,000 | 20,000 | 4,220 | 500 | 3,000 | 3 x 10-6 |
| Vinyl chloride | 0.02 | 2 | 2 | 3.6 | 1.0 | 1 | 5 x 10-5 |

aRisk-based PRGs concentration from residential water use scenario. When a contaminant had both carcinogenic and noncarcinogenic risks, the lower was chosen. Risk-based PRGs were calculated as shown below.
bValues listed are the maximum detected values outside of the remediation area (wells 71, 154, 155, 377, and 378).
cPicocuries per liter (pCi/L).
dThe proposed MCL for beta and photon emitters is 4 milliroentgen equivalent in man (mrem) ede/yr with a screening level of 50 pCi/L.
eMCL listed is a proposed value for adjusted gross alpha.

MCL - maximum contaminant level
NL - not listed
ND - not detected
PRG - preliminary remediation goal
SDWA - Safe Drinking Water Act
æg/L - micrograms per liter

$$\text{Chemical Carcinogen Risk-based PRG (æg/L)} = \frac{TR \times BW \times AT \times 1000\ æg/mg}{EF \times ED \times ([VF \times IRA \times SFi] + [IRW \times SFo])}$$

$$\text{Noncarcinogen Risk-based PRG (æ/L)} = \frac{TR \times BW \times AT \times 1000\ æg/mg}{EF \times ED \times \left[\frac{VF \times IRA}{RfDi} + \frac{IRW}{RfDo}\right]}$$

$$\text{Radionuclide Carcinogen Risk-based PRG (pCi/L)} = \frac{TR}{EF \times ED \times ([VF \times IRA \times SFi] + [IRW \times SFo))}$$

Where:

TR = Target risk (1 x 10-6 for carcinogens, hazard quotient of 1 for noncarcinogens)
BW = Body weight (age-adjusted for carcinogens-59 kg, for noncarcinogens - 70 kg)
AT = averaging time (25,550 days)
EF = exposure frequency (350 days/year)
ED = exposure duration (30 years)
VF = volatilization factor (where applicable = 0.5)
IRA = inhalation rate (age-adjusted for carcinogens - 19 m3/day, for noncarcinogens - 20 m3/day)
IRW = ingestion rate of water (age-adjusted for carcinogens - 1.8 L/day, for noncarcinogens - 2 L/day)
SFi = inhalation slope factor (chemicals - kg-day/mg, radionuclides 1/pCi)
SFo = oral slope factor (chemicals - kg-day/mg, radionuclides 1/pCi)
RfDi = inhalation reference dose (kg-day/mg)

RfDo = oral reference dose (kg-day/mg)



## 7.1. Common Elements

All alternatives now being considered for the site will include several common components. Each alternative includes surface controls, the implementation of institutional controls to limit access to the site, and long-term groundwater monitoring. Surface controls, such as grading and lining of existing ditches, will manage the surface water runon and runoff and reduce infiltration. Reducing infiltration will slow the rate at which contaminants migrate from the unsaturated soil into the groundwater. Institutional controls will be designed to control land and groundwater use. Such controls can take the form of access restrictions and fencing around the site to minimize contact with soils and deed restrictions to prevent groundwater usage onsite and downgradient on property currently owned by DOE. The site is currently fenced. Appropriate deed restrictions will be obtained at the time the facility is transferred. The monitoring activities will be conducted to document the effectiveness of the selected remedy.

Alternatives 3 through 7 include extracting the groundwater for disposal brough the Mound Plant NPDES-permitted outfall. This groundwater extraction will be effective a capturing contaminated groundwater before offsite migration can occur.

## 7.2. Description of the Alternatives

The alternatives contain elements that range from limited action through capping, containment, and in situ treatment. Descriptions of these elements are provided below. More detailed descriptions of the alternatives are provided in the FS.

- The no-action alternative (Alternative 1) involves no additional activities at the site.

- The limited-action alternative (Alternative 2) consists only of the common elements described above.

- The collection-and-disposal alternative (Alternative 3) also en compasses extraction of groundwater for disposal through the Mound Plant NPDES-permitted Outfall. Under this alternative, the soil contamination would be left in place.

- Under the alternatives incorporating a treatment option (Alternatives 4 through 7), groundwater would be extracted and treated onsite to remove VOCs.

- Under the capping alternatives (Alternatives 5, 7, and 9), a surface cap of low-permeability soil would be placed on the ground surface above known waste disposal areas that could

be considered potential sources of groundwater contamination. The cap would be designed for integration into the existing cap for the site sanitary landfill and surface drainage structures so that erosion and infiltration would be minimized.



- Under alternatives incorporating a subsurface barrier (Alternatives 6 and 7), groundwater would be contained onsite with a low-permeability subsurface wall around the western and southern perimeter of OU 1, which would be constructed by the slurry column technique. Groundwater within OU 1 would be extracted only at a rate sufficient to maintain a hydraulic gradient across the containment barrier toward OU 1.

- Under the in situ treatment alternatives (Alternatives 8 and 9), subsurface permeable treatment walls composed of a mixture of iron shavings and sand would be installed in the subsurface downgradient of the site. Slurry columns would serve to direct the flow of groundwater toward the treatment walls and minimize movement of groundwater offsite.

## 8. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

This section presents a detailed analysis of the alternatives that were considered. Each alternative is evaluated in detail using nine CERCLA evaluation criteria, which are categorized into the following three criteria groups:

- Threshold Criteria
  - Overall protection of human health and the environment addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

    Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether a remedy will meet all of the ARARs or other federal and state environmental laws and/or justifies a waiver on the basis of technical impracticability.

- Primary Balancing Criteria
  - Long-term effectiveness and performance refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

- Reduction of toxicity, mobility, or volume through treatment may be used as the performance measure of the treatment technologies.

- Short-term effectiveness addresses the period of time needed to achieve protection. Short-term effectiveness also considers any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability is the technical and administrative feasibility of remedy, including the availability of materials and services needed to implement a particular option. Cost includes estimated capital, operations, and maintenance costs expressed as net present worth costs.



- Modifying Criteria

- State/support agency acceptance reflects aspects of the preferred alternative and other alternatives that the support agency favors or to which the agency objects, as well as any specific comments regarding state ARARs or the proposed use of waivers. The assessment of state concerns may not be complete until after the public comment period on the RI/FS and Proposed Plan is held.

- Community acceptance summarizes the public's general response to the alternatives described in the Proposed Plan and in the RI/FS, based on public comments received. Like state acceptance, evaluations under this criterion usually will not be completed until after the public comment period is held.

The evaluation of alternatives is summarized in Table 9; cost detail is provided in Table 10. This section profiles the performance of the selected remedy against the remedial evaluation criteria, noting how it compares to the other options under consideration. Because the no-action and institutional controls alternatives, by themselves, do not protect human health and the environment, they are not considered an option for this site.

## 8.1. Threshold Criteria

To be considered a viable option, a remedial alternative must meet the threshold criteria or, in the case of compliance with ARARs, justify a waiver of a particular ARAR.

8.1.1. Overall Protection

All of the alternatives except 1 and 2 would provide adequate protection of human health and the environment by eliminating, reducing, or controlling risk through treatment, engineering controls, or
institutional controls.

8.1.2. Compliance with ARARs

The chemical-specific and action-specific ARARs are presented in Attachment B. All alternatives (except the no-action and institutional controls alternatives) were designed to meet all of the ARARs.
Under the no-action and institutional controls alternatives, ARARs would be exceeded at the point of
compliance. All remaining alternatives would meet their respective ARARs. The selected remedy treats VOC concentrations in the discharge water from the remediation system and will, in particular,
comply with the Chronic Freshwater Criteria ARARs.

8.2. Balancing Criteria

Once the threshold criteria are satisfied, the balancing criteria are used to weigh the relative merits of
various alternatives. The issues concerning the balancing criteria are displayed in Table 9.



Table 9. Summary of Remedial Action Alternative Comparison

| Alternative | Short Title | Protects Human Health and the Environment | Reduces Toxicity, Mobility, or Volume | Complies With ARARs | Short-term Effectiveness | Long-term Effectiveness | Implementability | Total Cost |
|---|---|---|---|---|---|---|---|---|
| 1 | No action | No | No | No | No | No | Easy | 90 |
| 2 | Institutional | No | No | No | No | No | Easy | $ 3,980,000 |
| 3 | Collect/ disposal | Yes | Yes | Adequatea | Yes | Adequate | Less difficult | $ 262,000c |
| 4 | Collect/treat/ | Yes | Yes | Adequatea | Yes | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Adequate | Yes | Less difficult | $ 1,740,000c | disposal | | | TMV |
| 5 | Collect/treat/ | Yes | Adequateb | Yes | Adequate | Yes | Less difficult |
| $ 2,390,000c | disposal/cap | | TMV | | | | |
| 6 | Contain/collect/ | Yes | Adequateb | Yes | Adequate | Yes | Moderately |
| $ 2,650,000c | treat/disposal | | TMV | | | | |
| 7 | Contain/collect/ | Yes | Adequateb | Yes | Adequate | Yes | Moderately |
| $ 3,300,000c | treat/disposal/ | | TMV | | | | |
| | difficult | cap | | | | | |
| 8 | In situ | Yes | Adequateb | Yes | Adequate | Yes | More difficult |
| $ 1,980,000c | groundwater | | TMV | | | | |
| | treatment | | | | | | |
| 9 | In situ | Yes | Adequateb | Yes | Adequate | Yes | More difficult |
| $ 2,630,000c | groundwater | | TMV | | | | |
| | treatment/cap | | | | | | |

a Quicker implementation when compared to other alternatives.
b Longer construction time when compared to other alternatives.
c This total cost is in addition to the total cost shown for Alternative 2 (common cost).

ARARs - applicable or relevant and appropriate requirements
MV - mobility and volume
TMV - toxicity, mobility end volume



Table 10. Summary of Detailed Cost Analysis

| | | | Annual | Present Value of | |
|---|---|---|---|---|---|
| | | | Operation and | 30-year | |
| | | | Maintenance | Operation and | Total Present |

| Alternative Number | Short Title | Total Capital Costa | Maintenance without Common Costa | Value without Common Costa |
|---|---|---|---|---|
| 1 | No action | $ 0 | $ 0 | $ 0 |
| 2 | Institutional | $ 139,000 | $ 201,000 | $ 3,840,000 |
| | Each of the following entries is IN ADDITION TO the cost shown for line 2 (Alternative 2). | | | |
| 3 | Collect/disposal | $ 205,000 | $ 3,000 | $ 57,300 |
| 4 | Collect/treat/disposal | $ 567,000 | $ 61,000 | $ 1,170,000 |
| 5 | Collect/treat/disposal/cap | $ 857,000 | $ 80,000 | $ 1,530,000 |
| 6 | Contain/collect/treat/disposal | $ 1,330,000 | $ 69,000 | $ 1,320,000 |
| 7 | Contain/collect/treat/disposal/cap | $ 1,620,000 | $ 88,000 | $ 1,680,000 |
| 8 | In situ groundwater treatment | $ 1,650,000 | $ 17,000 | $ 325,000 |
| 9 | In situ groundwater treatment/cap | $ 1,940,000 | $ 36,000 | $ 688,000 |

a Represents the common cost used in each cost estimate.
b Represents highest likely cost for treatment technology.

NOTE: Figures rounded to three significant digits after computations completed.



8.2.1. Short-Term Effectiveness

Alternatives 5, 7, and 9 provide the greatest short-term effectiveness because, immediately after installation, the surface cap would prevent contact with contaminated soils. Some dust generation is expected during installation of the cap; however, this risk could be easily reduced by dust control methods and worker protection. The cap would also rapidly reduce leachate movement from the unsaturated zone into the groundwater.

Alternatives 3, 4, 6, and 8, which do not include a surface cap but do include a fence around Area B, would have little short-term effectiveness because contact with contaminated soils would not be completely prevented. Potentially, onsite workers would be exposed to contaminated soils and the community could potentially be exposed to COCs through airborne dust.

Environmental impacts common to all alternatives include disturbance of biota in the construction areas. However, these would not be significant environmental impacts.

8.2.2. Long-Term Effectiveness and Permanence

Alternatives 7 and 9 provide the highest degrees of long-term effectiveness and permanence because they use a subsurface containment system (slurry columns) to passively reduce offsite movement of contaminated groundwater. Alternative 7 also employs groundwater recovery wells to extract contaminated groundwater from Area B and to ensure a hydraulic gradient toward Area B. Groundwater recovery wells would be effective over the long term at fulfilling these tasks. The permanence of these alternatives would also be considered high because, once the PRGs are met, groundwater contamination would remain onsite. These alternatives also use a surface cap to passively reduce leachate movement from the unsaturated zone. This technology would contribute to the high degree of effectiveness and permanence of these alternatives due to the resultant decrease in contaminant flux from the unsaturated zone.

Alternatives 6 and 8 also employ subsurface containment systems (slurry columns) around Area B. However, because these do not implement a surface cap to control contaminant flux from the unsaturated zone, their permanence would be considered less than Alternatives 7 and 9.

Alternatives 3, 4 and 5, which utilize groundwater recovery wells but no subsurface containment, would be less effective at preventing offsite movement of contaminated groundwater. Even if properly monitored and adjusted according to changing hydrogeologic conditions, a small amount of groundwater could potentially not be captured if one or more recovery wells were shut down for maintenance.



8.2.3. Overall Protection of Human Health and the Environment

Alternatives D, 7, and 9 provide adequate protection of human health and the environment by reducing the risk of soil contact and contaminated groundwater ingestion. Alternatives 3, 4, 6, and 8 reduce risk of contaminated groundwater ingestion but provide minimal reduction of soil contact risk.

Alternative 1 (no action) provides no protection of human health and the environment. Alternative 2 provides minimal reduction of the risk of contact with soil. Alternative 2 also provides some reduction of risk through groundwater ingestion onsite, but there is some uncertainty about the prevention of

offsite groundwater ingestion.

8.2.4. Reduction of Mobility, Toxicity, and Volume Through Treatment

All alternatives except 1, 2, and 3 reduce the mobility, toxicity, and volume of contaminated groundwater by employing UV/oxidation water treatment technology prior to its discharge through the NPDES-permitted outfall. This technology is reliable with proper operation rand maintenance.

Alternatives 1 (no action) and 2 (institutional controls) do not reduce mobility, toxicity, or volume of contaminated groundwater through treatment. Alternative 3 reduces only contaminant volume and mobility in the groundwater by implementing groundwater extraction.

8.2.5. Implementability

Technically, Alternative 2 would be the easiest to implement because it only involves construction of a fence. However, this alternative would be the most difficult to implement administratively because of uncertainties involving acquisition of land or water rights to prevent groundwater ingestion.

Alternatives 3, 4, and 5 could be implemented using standard construction techniques and practices. The water treatment technology required in Alternatives 4, 5, 6, and 7 is not widely used but, because it has been put into practice at several sites and is relatively uncomplicated to operate, it should be readily implementable.

Alternatives 5, 7, and 9, which involve the surface cap, would be less implementable than their counterparts that do not include a surface cap (Alternatives 4, 6, and 8). To make augmentation of the existing cap feasible, the low-permeability soil option was chosen since it was the best match to the existing cap and could be used to extend the cap over the desired areas with less disruption to the current containment system. Given the steep sides of the existing landfill, however, an added degree of difficulty exists in the design and implementation of the surface cap extension.



Alternatives 6 and 7, which involve construction of 8 subsurface barrier with slurry columns around Area B, would not be as readily implementable as the previous alternatives. Prior to slurry column installation, a soil-boring program for contaminant sampling and geotechnical testing must be conducted. The slurry column installation would then be implemented using common construction practices.

Alternatives 8 and 9, which involve subsurface barriers and a subsurface permeable treatment wall, would be less implementable than Alternatives 6 end 7 because treatability studies would be required

to design the permeable treatment well. The slurry column construction for this alternative would be
the same as described above.

## 9. SELECTED REMEDY

The selected remedy for controlling contamination from the soils and groundwater at OU 1 is Alternative 4 - Collection, Treatment, and Disposal of Groundwater. As discussed previously, the common elements of surface water controls, institutional controls to limit site access, and long-term groundwater monitoring will be part of the remedy as well. Based on groundwater studies conducted during the FS, it is currently envisioned that the collection (groundwater extraction) system will consist of two wells pumping at a combined rate of 45 gallons per minute. Additional groundwater modeling will be conducted during the remedial design phase, which will establish optimum location and pumping rates for the extraction wells. Some changes may be made to the remedy as a result of the remedial design and construction process. Such changes, in general, will reflect modifications resulting from the engineering design process.

Based on current information, this alternative would meet the USEPA remedial evaluation criteria. The alternative meets the threshold criteria (is protective of human health and the environment and satisfies all the ARARs) and satisfies the primary balancing criteria (short- and long-term effectiveness; reduction of toxicity, mobility, or volume; and implementability) for the least cost. Because it reduces toxicity and volume and controls mobility, the alternative also protects the Mound Plant production wells. The preferred alternative would be effective in capturing contaminated groundwater beneath the OU 1 site before it migrates offsite. The groundwater pump-and-treat system will reduce the contaminant mass in the subsurface and will continue to operate until groundwater meets the Preliminary Remediation Goals specified in Table 8. It is difficult to predict how long this will take, but for costing purposes, it was assumed the system would operated for a period of 30 years. The treatment system specified for this site could efficiently remove the VOCs to the preliminary remediation goals listed in Table 8. All extracted groundwater would be treated to levels that will comply with the requirements of the Mound Plant NPDES Permit.



The contemplated treatment system will primarily consist of a unit designed to remove VOCs from the water prior to discharge. Final determination of all required treatment will be made as part of

the detail design. There are several potentially viable treatment trains for VOCs, including cascade aeration, UV oxidation, and conventional air stripping; all offer the possibility of adequate treatment. Additionally, the CERCLA process allows for and promotes the use of innovative technologies whenever potentially practicable and cost-effective. Final selection of technologies will be mad during remedial design, when any of these systems may be determined to be optimal. Cascade aeration, as well as the other treatment trains, constitutes best available treatment.

Thus, the selected remedy-collection, treatment, and disposal-will provide a cost-effective remedial option that is easy to implement and that will adequately protect human health and the environment.

Following issuance of the ROD, three kinds of changes that require documentation can be made to the selected remedy. These are as follows:

- Minor changes that require differences to be documented in the post-ROD file.

- Significant changes that require the development of an explanation of significant differences for inclusion in the Administrative Record. Significant changes are those that modify or replace a component of the selected remedy.

- Fundamental changes that require the development of a ROD amendment and, thus, additional public comment. Fundamental changes are changes of the selected remedy that do not reflect the ROD with regard to scope (e.g., overall approach), performance, or cost.

At the time DOE proposes the specific treatment technology to be used, DOE, in consultation with USEPA and OEPA, will determine whether changes need to be made in the ROD end will implement the specified modification procedures.

## 10. STATUTORY DETERMINATIONS

The selected remedy protects human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate (ARAR) to the remedial action, and is cost-effective. A list of ARARs that will be attained by the selected remedy, along with the "To Be Considered" (TBC) item that was used, is provided as Attachment B. In implementing the selected remedy, DOE, USEPA, and OEPA have agreed to consider a procedure that is not legally binding. In implementing the selected remedy, DOE, USEPA, and OEPA have agreed to consider as a TBC the OEPA policy on wastewater discharge resulting from cleanup of response action sites contaminated with VOCs.

This remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable for this site, end satisfies the statutory preference for treatment as a principal element of the remedy. While the remedy calls for treatment of contaminated groundwater, treatment of soil at the site was not found to be practicable. The fact that the source of contamination is diffuse and no substantive onsite soil hot spots exist precludes a remedy consisting of excavation and treatment of contaminants in soil.

Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted within 5 years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

## 11. DOCUMENTATION OF SIGNIFICANT CHANGES

The OU 1 Proposed Plan was released for public comment in November 1994. The Proposed Plan identified Alternative 4 (Collection, Treatment, and Disposal) as the preferred alternative for groundwater remediation. DOE reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes were necessary to the remedy as originally identified in the Proposed Plan.



# RESPONSIVENESS SUMMARY

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# RECORD OF DECISION

# OPERABLE UNIT 1

# AREA B, MOUND PLANT, OHIO

June 1995

## RESPONSIVENESS SUMMARY

## 1. OVERVIEW

At the time of the public comment period (15 November 1994), DOE had identified a preferred alternative for OU 1, Area B. The recommended alternative, as published in the Proposed Plan, consisted of collection, treatment, and disposal of groundwater. The treated groundwater would be released to the Great Miami River.

Judging from the limited number of comments received during the public comment period, the citizens and other interested parties did not question the overall remediation strategy. Comments were directed to the nature and need for treatment, as well as the manner in which the treatment system would be operated.

These sections follow:

- Section 2, Background on Community Involvement.
- Section 3, Summary of Comments Received During the Public Comment Period and DOE Responses.
  - Section 3.1, Summary and Response to Local Community Concerns.
  - Section 3.2, Comprehensive Response to Specific Legal and Technical Questions.

- Section 4, Remaining Concerns.

- Attachment C, Community Relations Activities for OU 1, Area B.

## 2. BACKGROUND ON COMMUNITY INVOLVEMENT

Community reaction to Mound Plant has been mixed. Unlike most sites that handle nuclear material and hazardous chemicals, Mound Plant does not sit in an isolated location. The plant can be seen from downtown, schools, farm fields, parks, and homes. The backyards of a few Miamisburg residences



end at Mound Plant's fence. Also, Mound Plant has had a highly visible community image, with a long record of community service and philanthropy. Historically, the majority of the local residents have viewed Mound Plant as no threat to the community.

Community involvement for OU 1 has been integrated with community involvement activities for the Mound Plant Site as a whole. The Mound Plant CERCLA Community Relations Plan, published in 1990, provided for soliciting comment while informing the public about planned and ongoing actions. The public information activities are carried out through quarterly CERCLA public meetings and by periodic publication of a newsletter, the Superfund Update.

As the field investigation of OU 1 was completed, public information activities directed toward OU 1 were initiated. Specific items are:

- An update on the field investigation was included in the October 1993 Superfund Update.

- The budget priorities for OU 1 and the balance of the CERCLA program were the subject of a workshop at the October 1993 CERCLA public meeting.

- A briefing on the site conditions and environmental issues relating to OU 1 was presented at CERCLA public meetings on 14 June 1993 and 22 September 1994.

- The OU 1 RIR, containing results and interpretations of field investigations, was placed in the public reading room in May 1994.

- A brochure, Environmental Restoration at Mound, was published n July 1994 and included a short description of OU 1. A brochure providing more detail on OU 1 was published in September 1994.

- A fact sheet announcing the availability of the FS and the Proposed Plan was published in

November 1994.

- Public comments were solicited and received at a public hearing on 8 December 1994. The transcript of that hearing is available in the public reading room.

- In response to comments, a second fact sheet was published ir December 1994.

- The public comment period remained open until 31 January 1995.



## 3. SUMMARY OF PUBLIC COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD AND DOE RESPONSES

The public comment period extended from 15 November 1994 through 31 January 1995. A public meeting and hearing was held on 8 December 1994. Two comments were received at the hearing. Two sets of written comments were received from technical advisors to Miamisburg Environmental Safety and Health (MESH). The state of Ohio raised one additional technical issue.

### 3.1. Summary and Response to Local Community Concerns

1. Selection of Alternative 4 over Alternative 3.

At the 8 December 1994 public meeting for the OU 1 Proposed Plan, a question was raised concerning
Table 1 on page 9 of the Proposed Plan. The question concerned the apparent similarity of Alternatives 3 and 4, with the exception of maximum total cost.

DOE Response: Table 9, in the ROD, updates and clarifies Table 1 by identifying the reduction of
toxicity, mobility, or volume of contaminants that each alternative addresses. Alternative 3 meets the
mobility and volume reduction statutory preference for selecting remedial actions (page 4-10 of the
OU 1 FS). It does not address toxicity reduction, which is also a statutory preference for selecting
remedial actions. Therefore, DOE, in consultation with the USEPA and OEPA, has determined that Alternative 4, which includes treatment to reduce toxicity, is preferable. The reduction of toxicity,
mobility, or volume for Alternative 4 is explained on page 4-14 of the FS.

Guidance from the OEPA indicates that wastewater discharges resulting from cleanup of response action sites contaminated with VOCs need to be treated with the best available technology for toxicity
reduction. The state of Ohio believes that Alternative 3 does not meet those requirements.

The NCP (40 CFR 300) identifies two additional "modifying criteria," which are (1) state acceptance
and (2) community acceptance. Based on the state's position on Alternative 3, Alternative 4 was chosen as the preferred alterative. This Responsiveness Summary incorporates an evaluation of community acceptance based on public comments.

2. Compatibility with overall remedy for The Site.

At the 8 December 1994 public meeting for the OU 1 Proposed Plan, a question was raised whether the remedy for OU 1 would help or hinder remedial action for the Site as a whole. The recommendation was made to "put your arms around the whole project."

DOE Response: DOE is ultimately concerned with a remedy for the Mound Plant CERCLA Site as a whole. The Site has been broken down into separate OUs to facilitate the planning and investigation.
OU 1 is the first unit to be considered for final remedial action. The other OUs also likely will be
considered one at a time to maintain a reasonable rate of progress. However, each removal action,
interim remedial action, or final remedial action is evaluated to ensure that it s unlikely to interfere with
any overall remedy for the complete Site.

The selected remedy for OU 1 will withdraw groundwater from beneath an immediately adjacent to OU 1. A small portion of the groundwater that now flows down the tributary valley and enters the
BVA could be diverted into the remediation wells. The effect of the remediation on the hydraulic
performance of the plant production wells is expected to be immeasurably small. Thus, the selected
remedy is expected to be compatible with potential remedial actions in other parts of the plant. Further, it should support or assist in controlling migration of contamination thus directly supporting
a range of alternatives. As other portions of the plant are considered for remediation, DOE will reconsider this issue.

3. Peter Townsend, MESH Technical Advisor, stated, "I conclude that remedial alternative 4 is the
most reasonable alternative for clean-up of the landfill and overflow pond area. Alternative 4 will
involve ground water collection and treatment, and appears capable of preventing further contamination of groundwater in the immediate area of the overflow pond and existing landfill."

Mr. Townsend went on to comment on the occurrence of 1,1,1-TCA in The BVA. He agreed with the assertion in the RIR that OU 1 was not the source of this contaminant, but suggested that it could still
be the result of Mound Plant activities. He identified the NPDES 001 outfall pipe as a possible source,
since it had (formerly) been an unsealed, butted cement pipe. Mr. Town,send recommended that consideration of this possible source be considered in the OU 1 FS or a future document.

DOE Response: This commentor agrees with the DOE selection of the remedial alternative presented
in the OU 1 Proposed Plan. However, concern is raised regarding offsite contamination, which DOE
has concluded is not related to OU 1 or, in fact, to Mound Plant. The commentor misinterprets a statement on page 2-20 of the RIR and concludes that VOC contamination was discovered and caused

some private residences to be connected to Miamisburg city water. The statement says that "In January 1988, residences that used groundwater from wells 0901, 0902, 0903, 0905, 0907, and 0908 (Figure 2.5 in the RIR) were connected to Miamisburg city water due to local organic contamination." This group of wells was owned by the operator of a trailer park, who supplied drinking water to the residents. This system met the definition of a community water system and was subject to the Safe Drinking Water Act (SDWA) regulations. It is DOE's position that these residences did not discontinue use of these wells as a result of VOC contamination originating from Mound Plant.
The switch to city water was caused, we believe, by the owner's difficulty and expense involved with the testing and operating conditions required to comply with SDWA regulations. During 1986 to 1988, Mound Plant conducted at least six separate sampling events for wells 0901 through 0908. No VOCs were detected in any of these events; specifically, 1,1,1-TCA was not detected. This commentor also speculates that the source of the alleged 1,1,1-TCA plume was the Mound Plant NPDES outfall 001 pipeline. To clarify the situation, Mound Plant drawings and long-time employees were consulted.
Drawings indicate that the pipeline is 12-inch-diameter vitrified clay pipe, of bell and spigot configuration, from west of Cincinnati-Dayton Pike to the river. This configuration would require each joint to be filled with mortar to allow proper alignment. As part of a site-wide program to upgrade sewer lines, this pipeline was slip-lined with a continuous plastic liner in approximately 1980 to 1981.
This was done as a good management practice, not because of a known contamination problem. No VOC contamination has been detected from the wells (0127, 0128, 0302, 0303, 0343, 0383) located due south of the 001 outfall pipe, which confirms there is no VOC contamination as a result of possible leakage from the 001 discharge pipe.

4. Jeff Fisher, MESH Technical Advisor, provided the following comments:

a. No remediation goals (except ARARs were described for surface and ground water, surface and deep soil, sediment and air. Clean up or treatment is fine, but goals need to be established and agreed upon by the USEPA, OEPA, Mound, and Stakeholders. A clear assessment of the treatment system's ability to meet cleanup goals is necessary. Without a target you are just "shooting arrows at a wall."

DOE Response: All of these issues are addressed in the OU 1 FS, which was released for public review with the Proposed Plan. Remediation goals were established and cleanup targets were agreed upon in extensive discussions among Mound Plant, DOE, USEPA and OEPA.

b. Offsite contamination needs to be addressed and workable solutions discussed by the Mound, regulators, and stakeholders. Environmental contamination extends beyond the boundaries of Mound.

DOE Response: Offsite issues are being addressed through the OU 9 (site-wide) RI/FS process, as well as through additional OUs (such as the Miami-Erie Canal). Since conditions at OU 1 do not lead to offsite contamination, it is not addressed in the current documents.

Mr. Fisher went on to address comments to the OU 1 RIR, which was placed in the reading room in May 1994. Although not pertinent to the Proposed Plan, the comments and responses are provided below.

a. Please explain the concept of "background" as it pertains to cleanup of chemicals and radionuclides. Is it US EPA policy to use background values obtained from the Mound site? How are these used or compared to background values obtained from sites distant from the Mound?

DOE Response: Chemical and radiological background for the Mound Plant Site is being defined in a series of data reports published as part of the OU 9 (site-wide) RI. The background data for surface soils were published in 1994 (Background Soils Investigation Soil Chemistry Report, Technical Memorandum, Revision 2, September 1994). This document is available in the public reading room. Background statements for groundwater, surface water, and sediments are being prepared. All background will be based on data from the vicinity of, but beyond the influence of, Mound Plant. Use of background data will be on a case-by-case basis. No reliance on background was used in selecting the remedy for OU 1.

b. For toxicity values that reference the ECAO [Environmental Criteria and Assessment Office], please supply written documentation showing the derivation of the toxicity value. Please state what year of HEAST tables were cited. Are Heast tables prior to 1994 used?

DOE Response: Toxicity values were obtained from the USEPA, as cited in the text and Appendix J of the OU 1 RIR. No independent derivation of toxicity was made, so no additional documentation is available. HEAST tables from 1993 were used, since this effort was completed in 1993.

c. There are several typographical errors, but the errors did not detract from the intent of the document.

DOE Response: Noted.

d. The overflow pond appears to be without adequate analytical data and was not included in the risk assessment. Without this added to the baseline risk assessment, the baseline risk assessment is inadequate and does not address all important pathways of exposure.

DOE Response: As discussed in the RIR, the overflow pond is part of the plant drainage system, which is being studied as part of the OU 9 investigation. The limited data available suggest that the overflow pond is not a significant direct source of contamination to the aquifer system. The pond water and sediment are not highly contaminated, and the leakage through the liner is not anticipated to be significant. These issues are addressed in sections 4.2 and 4.4.4 of the RIR. The pond is not an important pathway of exposure for OU 1.

e. The documents pertaining to OU 1 need to be available to the public in draft form. This is a very serious problem that needs to be corrected.

DOE Response: All documents are reviewed in draft by both regulatory agencies (USEPA and OEPA), who approve the final versions prior to public release. This is consistent with CERCLA guidance.

5. The following written comments were received from an anonymous reviewer of the OU 1 Proposed Plan:

a. Are the Miami Erie Canal sediments the only potential source of tritium in the BVA?

DOE Response: No. The canal is the major source, but small amounts of tritium have also been detected in wells in the Old Burn Area and Old Landfill Area.

b. What proof do you have that Mound is the source of the VOC contamination presently detected in the BVA?

DOE Response: The highest levels of VOCs have been detected onsite in the OU 1 location. Historical Mound well monitoring data also confirm this.

c. Are there any known current tritium sources that may eventually reach the BVA? Are there any known current tritium sources that may reach the canal?



DOE Response: c1) Yes, under the SW Building. However, it is unlikely that the SW Building tritium source will reach the BVA. c2) Yes, tritium reached the canal as a result of Mound discharging

tritiated
plant water in the Mound drainage ditch that flows into the canal.

d. What are the tritium levels in the main hill seeps?

DOE Response: The highest levels are in the low 100s nanocurie per liter range. The seeps are not
a threat to the aquifer.

e. What historic maximum levels of VOCs were detected in the upstream aquifer (from the Mound Plant) during a Mound sampling/analysis event or "other's" sampling/analysis event?

DOE Response: The observed levels of VOCs in the background wells (completed in the BVA) are as follows:

| Chemical | Range of Detected Concentrations (æg/L) | Mean of Concentrations (æg/L) |
|---|---|---|
| 1,1,1-TCA | 0.46 - 2.3 | 0.53 |
| 1,2-cis-DCE | 1.1 - 1.1 | 0.55 |
| PCE | 11. - 12. | 2.21 |
| Trichloromethane (chloroform) | 0.50 - 0.57 | 0.30 |

f. What are the current levels of VOCs upstream from Mound Plant7

DOE Response: The OU 9 Groundwater Sweeps Report, dated January 1995, showed the following monitoring well data:

| | | |
|---|---|---|
| Well 0118 | 0.68 æg/L | 1,2-Dichloroethane |
| Well O137 | 1.6/æg/L | Trichloroethane |
| Well O137 | 0.58 æg/L | Trichloromethane (chloroform) |
| Well O138 | 0.53 æg/L | 1,2-Dichiorethene |
| Well O138 | 6.0 æg/L | Acetonitrile |
| Well O138 | 0.58 æg/L | Trichloromethane (chloroform) |
| Well 0138 | 9.9 æg/L | Trichloromethane (chloroform) |
| Well 0327 | 2.3 æg/L | 1,1,1-Trichloroethane |
| Well 0327 | 12.0 æg/L | Tetrachloroethene |
| Well 0327 | 0.50 æg/L | Trichloromethane (Chloroform) |
| Well 0328 | 1.1 æg/L | 1,2-cis-Dichloroethene |
| Well 0328 | 9.0 æg/L | Bis (2-Ethylhexyl) Phthalate |
| Well 0332 | 8.9/æg/L | Dichloromethane (Methylene Chloride) |



g. What ground water model was used to determine the contribution of VOC contamination from the Mound historic landfill verses the historic upstream VOC contamination?

DOE Response: For the VOCs, the Darcy Model was used.

h. How does the OU 4 canal remediation schedule, the OU 1 remediation schedule and the OU 2 remediation schedule tie into one another?

DOE Response: Because 0U 1 groundwater contamination is the reason the Mound site was put on

the NPL, or Superfund, OU 1 has been given a high priority for cleanup by the DOE. The OU 1 VOC contamination problem is a result of past disposal practices in OU 1 and is not interactive with the other Mound Plant OU schedules.

i. Will all other known sources of VOCs be completely remediated prior to the implementation of the OU 1 Proposed Plan?

DOE Response: No. However, at this time no other plant VOC sources are impacting OU 1.

j. Do you plan to remediate OU 4 (the canal), contain the main hill seeps (OU 2), or remediate the VOC contaminated soils in the landfill prior to remediating the aquifer?

DOE Response: j1) No. OU 2 and OU 4 are not affecting OU 1 (see response to h). j2) The site sanitary landfill and overflow pond overlie most of OU 1, making large-scale excavation prohibitive.

k. What are the calculated risks (cancer) for the no-action alternative for OU 17

DOE Response: The highest overall risk for the onsite resident is 5x10-4.

i. What is the total cost for the OU 1 Proposed Plan implementation?

DOE Response: The estimated cost for the proposed remedy, collection, treatment, and disposal is $1,740,000. This includes installation costs and annual operations and maintenance costs for an estimated 30-year remediation cycle.

m. What long term ground water monitoring and sampling will be necessary after remediation is complete? Is there sufficient Congressional budget available to support the long term monitoring work?

DOE Response: m1) Monitoring and sampling requirements after OU 1 remediation is completed will be determined based on USEPA groundwater regulatory guidance. m2) Budget provisions have been made for this work, but this funding is subject to change.



n. What is the cost for the long term monitoring and sampling in the current five-year plan? How much will the long term monitoring and sampling cost?

DOE Response: No long-term monitoring and sampling funding has been specifically identified in the OU 1 5-year plan. Costs for the long-term monitoring and sampling after OU 1 is remediated will be determined based on USEPA groundwater guidance requirements (see response to m).

o. Has OEPA and US EPA approved the proposed remedial actions based on risk concerns?

DOE Response: Yes. The Proposed Plan preferred alternative has been approved by both USEPA and OEPA.

p. What risk level is acceptable as a no action level by Ohio EPA for tritiun b? for VOCs? for tritium
and VOCs based on levels found in the BVA?

DOE Response: The acceptable USEPA cancer risk levels are 1x10-4 to 1x10-6.

q. What risk level is acceptable as a no action level by US EPA for tritium? or VOCs? for tritium and
VOCs based on levels found in the BVA?

DOE Response: The acceptable USEPA cancer risk levels are 1x10-4 to 1x10-6.

r. What levels of risk are necessary for the "no action alternative" to be approved by the Ohio EPA
and US EPA regulators assigned to oversee work at Mound7 at WPAFB?

DOE Response: The acceptable USEPA cancer risk levels are 1x10-4 to 1x10-6.

3.2. Comprehensive Response to Specific Legal and Technical Questions

As part of its continuing review of the OU 1 FS and Proposed Plan, the OEPA and the Regional Air Pollution Control Authority (RAPCA) examined the need for air-related permits for the remedy. These
agencies suggested that an application to and review by RAPCA are appropriate. Subsequent conversations and correspondence confirmed that neither a permit application nor a design review is
needed.

## 4. REMAINING CONCERNS

None.



## ATTACHMENT A

## STATE CONCURRENCE LETTER

State of Ohio Environmental Protection Agency

STREET ADDRESS:

MAILING ADDRESS:
1800 WaterMark Drive
P.O. Box 1049
Columbus, OH 43215-1099
Columbus, OH 43216-1049

TELE: (614) 644-3020 FAX: (614) 644-2329

May 22. t99s

RE: US DOE MOUND
OPERABLE UNIT 1
RECORD OF DECISION
CONCURRENCE LETTER

Mr. Valdas Adamkus
Regional Administrator
US EPA Region V
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. J. Phil Hamric
Manager, Ohio Field Office
US Department of Energy
P.O. Box 3020
Miamisburg, Ohio 45343-3020

Dear Mr. Admakus and Mr. Hamric:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the April 1995 Operable Unit 1 (OU1) Record of Decision (ROD) for the DOE Mound Superfund site in Montgomery County.

The OU1 ROD is the first ROD to be completed for the operable units at the DOE Mound. This remedial action is not the final remedial action for the DOE Mound site, but is intended to be a final remedial action for OU1. Decisions regarding remedial actions for other portions of the site are being addressed in other operable units, which will ultimately be considered in a Site-wide Remedial Investigation and Feasibility Study, which are in progress. A decision on the final remedial action for the DOE Mound Site will be nude in a subsequent decision-making process.

The OU1 ROD addresses groundwater contamination by preventing migration of contamination (volatile organic compounds) toward the DOE Mound production well. The selected remedial action will result in the minimization of exposure to potential receptors of the groundwater contamination. The selected alternative includes the following components:

* Installation of two groundwater extraction wells within OU1, using standard equipment and procedures. Specifics regarding the design of the extraction system will be determined in the Remedial Design.

* Treating the extracted groundwater to remove volatile organic compounds and other constituents, as required, using cascade aeration, ultraviolet oxidation, conventional air stripping, or other suitable treatment units including innovative technologies which will achieve the remedial objectives.

* Discharging the treated groundwater to the Great Miami River through the existing plant NPDES outfall or a new outfall. Permit modifications may be needed to accommodate the final design of the remedy.

The estimated present cost of the selected remedy is $706,000 in 1995 dollars. The estimated annual present worth of operation and maintenance costs are $1,170,000 for a period of 30 years.

Ohio EPA concurs with the selected remedy based upon this review. Since, the selected remedy does not inlvolve establishment or modification of the site sanitary landfill, Ohio Administrative. Code 3745-27-07 is not considered to be Applicable or Relevant and Appropriate (AEAR), although it would be a potential ARAR for other OU1 remedies.

Because this remedy may result in hazardous substances remaining Onsite above health-based levels, a review will be conducted within five years after commencement of this remedial action to ensure that the remedy continues to adequately protect human health and he environment.

Sincerely,

<IMG SRC 0595292G>

Donald R. Schregardus
Director

DRS/klf

cc: Jenny Tiell, Director's Office
Tim Fischer, USEPA Region V
Jeff Hurdley, OEPA Legal
Graham Mitchell, OEPA/OFFO
Jan Carlson, OEPA/DERR
Warren Shefatal, DOE MB
Oba Vincent, DOE MB
Art Kleinrath, DOE MB
Brian Nickel, OEPA/OFFO
Ruth Vandegrift, ODH
Ray Beaumier, OEPA/DERR

ATTACHMENT B

ARARs TABLES

Table 1. State Chemical-Specific ARARs for OU 1

| Regulation Title or Subject/Revised Code Paragraph | Regulation Description | | Comments |
|---|---|---|---|
| Regulation Application | | ARAR | |
| Prohibits Violation of Air Pollution Control Rules/3704.05 A-I<br>May pertain to any site where emissions of an air contaminant occur either as s preexisting condition of the site or as a result of remedial activities.<br>Should be considered for virtually all sites. | Prohibits emission of an air contaminant in violation of Section 3704 or any rule, permit, order, or variance issued pursuant to that section of the ORC. | | Implementation of the substantive provisions of state air requirements as required by Section 121 (d) of CERCLA. |
| Handling Low-Level Radioactive Waste<br>Pertains to all sites at which low-level radioactive waste has come to be located.<br>Prohibited/3734.02.7<br>A,B | A) Prohibits commingling low-level radioactive waste with any type of solid, hazardous, or infectious waste.<br>B) He owner or operator of a solid, infectious, or hazardous waste facility shall accept any radioactive waste for transfer, storage, treatment, or disposal. | ARAR | Radioactive wastes generated as part of remedial actions at OU 1 will be managed separately from non-radioactive materials. |
| "Five Freedoms" for Surface Water/<br>Pertains to discharges to surface waters as a result of remediation and to bodies subject to quality standards do not occur within any omits surface waters affected by site condition.<br>3745.1-04 A,B,C,D,E<br>Alternatives that involve discharge will be addressed in action-specific ARARs. | All surface waters of the state shall be free from:<br>A) Objectionable suspended solids.<br>B) Floating debris, oil, and scum.<br>C) Materials that create a nuisance.<br>D) Toxic, harmful, or lethal substances.<br>D) Nutrients that create nuisance growth. | ARAR | Surface water criteria OU 1. to surface water |
| Antidegradation Policy<br>Pertains to discharges to surface water bodies subject to quality | Prevents degradation of surface water quality below | ARAR | Surface water |

| | | | | |
|---|---|---|---|---|
| for Surface Water/ 3745-1-05 A,B,C | designated use or existing water quality. Existing instream uses shall be maintained and protected. The most stringent controls for treatment shall be required by the director of the USEPA for all new end existing point source discharges. Prevents any degradation of "State Resource Waters." | as a result of remedial action and any surface water affected by site conditions. | to criteria 1. Alternatives that involve discharge to surface water will be addressed in action-specific ARARs. | standards do not occur within all |
| Mixing Zones for Surface Water/ 3745-1-O6 A,B | A) Presents the criteria for establishing non-thermal mixing zones for point source discharges. B) Presents the criteria for establishing thermal mixing zones for point source discharges. | Applied as a term of discharge permit to install. | ARAR Alternatives 1. Alternatives that involve discharge to surface water will be addressed in action-specific ARARs. | involving direct discharge will comply. |
| Water Quality Criteria/ 3745-1-07 C | Establishes water quality criteria for pollutants that do not have specific numerical or narrative criteria identified in Tables 7-2 trough 7-15 of this rule. | Pertains to discharges to surface waters as a result of remedial action and any surface waters affected by site conditions. | ARAR Surface water criteria 1. Alternatives that involve discharge to surface water will be addressed in action-specific ARARs. | bodies subject to quality standards do not occur within OU |



Table 1. (page 2 of 5)

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | Regulation Application | ARAR | Comments |
|---|---|---|---|---|
| Particulate Ambient Air Quality Standards/ 3745-17-02 A,B,C | Establishes specific standards for total suspended particulates. | Pertains to any site that may emit measurable quantities of particulate | ARAR | Air emissions may be involved as part of the treatment in several of the |

| | | | |
|---|---|---|---|
| matter (both stack and fugitive). | | | alternatives. Alternatives involving air |
| Consider for sites that will undergo | | | emissions will be coordinated with USEPA |
| excavation, demolition, cap installation, | | | and OEPA to ensure particulate emissions |
| clearing and grubbing, incineration, end | | | are within acceptable limits. |
| waste fuel recovery. | | | |
| Particulate | Degradation of air quality in any area where air quality is | | |
| Pertains to sites in certain locations | | ARAR | Air emissions may be involved as part of |
| Nondegradation | better then required by 3746-17-02 is prohibited. | | |
| that may emit or allow the escape of | | | the treatment in several of the |
| Policy/3745-17-05 | | | |
| particulates (both stack and fugitive). | | | alternatives. Alternatives involving air |
| Consider for sites that will undergo | | | emissions will be coordinated with USEPA |
| excavation, demolition, cap installation, | | | and OEPA to ensure particulate emissions |
| clearing and grubbing, and incineration. | | | are within acceptable limits. |
| Evaluation of | Any person generating a waste must determine if that | | |
| Pertains to sites at which wastes of | | ARAR | Any materials generated during |
| Wastes/3745-52-11 | waste is hazardous waste (either through listing or by | | |
| any type (both Solid end hazardous) are | | | construction or implementation of remedial |
| A-D | characteristic). | | |
| located. | | | actions win be evaluated to determine if |
| they are identifiable as a hazardous waste, | | | |
| or if they are sufficiently similar to | | | |
| hazardous wastes so that hazardous | | | |
| waste management standards should be | | | |
| applied. | | | |
| Ground Water | Establishes circumstances under which an operator of a | | |
| Pertains to all sites with land-based | | ARAR | Historic disposal of hazardous waste |
| Protection: | hazardous waste facility must implement a groundwater | | |
| hazardous waste unite (surface | | | occurred within OU 1. Groundwater |
| Applicability/ | protection program or a corrective action program. | | |

| | | | |
|---|---|---|---|
| impoundments, waste piles, land treatment units, and landfills), including existing land-based areas of the hazardous waste contamination. | | | monitoring implemented as part of the 3745-54-90 remedial alternatives will incorporate the requirements of the hazardous waste regulations. |
| Required Programs/ Whenever hazardous constituents from a regulated unit are detected at the compliance point, or whenever groundwater protection standards are exceeded between the compliance point and the downgradient facility property boundary. | Establishes requirements for conducting a groundwater compliance monitoring and response program. | ARAR | Exceedencee of groundwater protection 3745-54-91 (A)-IB) standards have been observed within OU 1. Groundwater monitoring program is ongoing; a program will be implemented as part of a remedial alternative that will follow requirements of this ARAR. |



Table 1. (page 3 of 5)

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | | Comments |
|---|---|---|---|
| Regulation Application | | ARAR | |
| Maximum Contaminant Levels for Inorganic Chemicals/3745-81-11 A,B | Presents maximum contaminant levels for inorganics. | ARAR | Because of the potential impacts to the BVA, this standard will be applied. |
| Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as a drinking | | | |

water source.

| | | | |
|---|---|---|---|
| Maximum Contaminant Levels for Organic Chemicals/3745-81-12 A,B,C | Presents maximum contaminant levels for organics. Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as a drinking water source. | ARAR | Because of the potential impacts to the BVA, this standard will be applied. |
| Maximum Contaminent Levels for Turbidity/ 3745-81-13 A,8 | Presents maximum Contaminent levels for turbidity. Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as a drinking water source. | ARAR | Because of the potential Impacts to the BVA, this standard will be applied. |
| Maximum Contaminant Levels/ 3745-81-14 A-E | Presents maximum contaminant levels for microbiological contaminants. Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as a drinking water source. | ARAR | Because of the potential impacts to the BVA, this standard will be applied. |
| Maximum Contaminant Levels for Radium-226, -228, and Gross Alpha/ 3745-81-15 A,B | Presses maximum contaminant levels for radium-226, radium-228, and gross alpha particle activity. Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as s drinking water source. | ARAR | Because of the potential Impacts to the BVA, this standard will be applied. |
| Maximum Contaminant Levels for Bets Particle | Presents maximum Contaminent levels for beta particle find photon radioactivity from men-made radionuclides. Pertains to any site that has contaminated surface or groundwater | ARAR | Because of the potential impacts to the BVA, this |

standard will be applied.
and Photon
this is either being used or has the
Radioactivity/
potential for being used as a drinking
3746-81-16 A,B
water source.



Table 1. (page 4 of 5)

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | ARAS | Comments |
|---|---|---|---|
| Microbiological Contaminant Sampling and Analytical Requirements/ 3745-81-21 A-B | Presents sampling and analytical requirements for microbiological contaminants. | ARAS | Appropriate methods for monitoring compliance with ARARs will be coordinated with OEPA and USEPA. Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as a drinking water source. |
| Turbidity Centeminent Sampling and Analytical Requirements/ 3745-81-22 A-B | Presents sampling and analytical requirements for turbidity. | ARAS | Appropriate methods for monitoring compliance with ARARs will be coordinated with OEPA and USEPA. Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as a drinking water source. |
| Inorganic Contaminant Monitoring Requirements/ | Presents monitoring requirements for inorganic contaminants. | ARAS | Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as a drinking water source. Appropriate methods for monitoring compliance with ARARs will be coordinated with OEPA and USEPA. |

| | | | |
|---|---|---|---|
| | that is either being used or has the potential for being used as a drinking water source. | | coordinated with OEPA and USEPA. |
| Organic Contaminant Monitoring Requirements/ 3745-81-23 A-E | Presents monitoring requirements for organic contaminants. | ARAS | Appropriate methods for monitoring compliance with ARARs will be coordinated with OEPA and USEPA. |
| Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as a drinking water source. | | | |
| Analytical Methods for Radioactivity/ 3745-81-25 A-D | Presents analytical methods for radioactivity, | ARAR | Appropriate methods for monitoring compliance with ARARs will be coordinated with OEPA and USEPA. |
| Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as a drinking water source. | | | |
| Monitoring Frequency Radioactivity/ 3745-81-26 A-C | Presents monitoring requirements for radioactivity. | ARAS | Appropriate methods for monitoring compliance with ARARs will be coordinated with OEPA and USEPA. |
| Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as a drinking water source. | | | |

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | | |
|---|---|---|---|
| Regulation Application | | ARAR | Comments |
| Analytical Techniques/ 3745-81-27 A-E<br>Pertains to any site that has contaminated surface or groundwater that is either being used or has the potential for being used as a drinking water source. | Presents general analytical techniques for maximum contaminant levels. | ARAR | Appropriate methods for monitoring compliance with ARARs will be coordinated with OEPA and USEPA. |
| Requirements for a Variance from MCLs/ 3745-81-40 A-C<br>Pertains to any site which has contaminanted ground or surface water that is either being used, or has the potential for use, as a drinking water source. | Provides criteria by which director may grant variance from MCLs. | ARAR | If required, the remedy will comply with this provision. |
| Alternative Treatment Technique Variance/ 3745-81-46<br>Pertains to any site which has contaminated ground or surface water that is either being used, or has the potential for use, as a drinking water source. | Allows for the use of alternative treatment techniques to attain MCLs. | ARAR | If required, the remedy will comply with this provision. |
| Prohibition of Nuisances/3767.14<br>Pertained to all sites located adjacent to lakes, streams, or drains. | Prohibition against throwing refuse, oil, or filth into lakes, streams, or drains. | ARAR | |

ARAR - applicable or relevant and appropriate requirement
BVA - Buried Valley aquifer
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
MCL - maximum contaminant level
OEPA - Ohio Environmental Protection Agency
ORC - Ohio Revised Code
OU 1 - Operable Unit 1
USEPA - U.S. Environmental Protection Agency

Table 2. Federal Chemical-Specific ARARa for OU 1

| Regulatory Program | Requirement | ARAR | Comment |
|---|---|---|---|
| CWA | Acute CWA freshwater toxicity criterion (CWA 304). | ARAR | Compliance is specifically required by CERCLA 121 (d) where relevant and appropriate. Will be applied except where more appropriate standards exist. For example, standards specifically intended for groundwater or drinking. |
| | Chronic CWA freshwater toxicity criterion (CWA 304). | | |
| | USEPA ambient water quality criteria for protection of human health aquatic organisms, and drinking water standards (CWA 304l. | | |
| | USEPA ambient water quality criteria for protection of human health aquatic organisms only (CWA 304). | | |
| Safe Drinking Water Act | Maximum contaminant levels (40 CFR .11 to 141.16). | ARAR | Compliance is specifically required by CERCLA 121 (d) where relevant and appropriate. |
| | Maximum contaminant level goals (40 CFR 141.50) | | |
| Resource Conservation and Recovery Act Groundwater Monitoring Requirements | Groundwater Protection Program for Hazardous Waste and "Regulated Units" (40 CFR 264 Subpart F). | ARAR | Considered relevant and appropriate because of historic disposal of apparent hazardous wastes. |

ARAR - applicable or relevant and appropriate requirement

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CWA - Clean Water Act
USEPA - U.S. Environmental Protection Agency



Table 3. State Location-Specific ARARs for OU 1

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | Regulation Application | ARAR | Comments |
|---|---|---|---|---|
| "Digging" Where Hazardous or Solid Waste Facility Was Located/3734.02 (H) | Filling, grading, excavating, building, drilling or mining on land where a hazardous waste or solid waste facility was operated is prohibited without prior authorization form the director of the OEPA. | Pertains to any site where hazardous or solid waste is located. | ARAR | Implementation of the substantive provisions of state requirements relating to intrusive activities at former disposal |
| Prohibits Open Dumping or Burning/ 3734.03 | Prohibits open burning or open dumping of solid waste or treated or untreated infectious waste. | Pertains to any site at which solid waste has come to be located or will be generated during a rememdial action. | ARAR | Solid wastes generated as part of the remedy will be subject to this requirement. |
| Hazardous Waste Facility Environmental Impact/3734.06 (D)(6)(c) | A hazardous waste facility installation and operation permit shaft not be approved unless the facility is proven to represent the minimum adverse environmental impact considering the state of available technology, the nature and economics of various alternatives, and other pertinent as siting criteria. | Pertains to all sites where hazardous wastes are located and/or where hazardous wastes will be treated, stored, or disposed of. May function | ARAR | While no permit is required, remedial alternatives will be coordinated with the USEPA end OEPA. |
| Hazardous Waste | (D)(6)(d). A hazardous waste facility installation end | Pertains to all sites | | |

| | | | |
|---|---|---|---|
| Siting Criteria/ 3734.05 (D)(6)((d)(g)(h) Pertinent if waste has come to be located and/or at which hazardous will be treated, stored, or disposed of. May function as seating criteria. | operation permit shall not be approved unless it proves that the facility represent the minimum risk of all of the following:<br>(i) Contamination of ground and surface waters.<br>(ii) Fires or explosions from treatment, storage, or disposal methods.<br>(iii) Accident during transportation.<br>(iv) Impact on public health and safety.<br>(v) Soil contamination.<br>(D)(6)(g)(h). Prohibits the following location for treatment, storage and disposal of acute hazardous waste:<br>(i) Within 2,000 feet of any residence, school, hospital, jail or prison.<br>(ii) Any naturally occurring wetland.<br>(iii) Any flood hazard area.<br>(iv) Within any state park or national park or recreation area. | | |
| Water Use Designations for Southwest Ohio Tributaries/3745-1-17 Pertinent if stress or stream segment is onsite and is affected by site conditions or if remedy includes direct discharge. Used by DWQPA to establish waste load allocations. | Establishes water use designations for stream segments within the Southwest Ohio Tributeries Basin. | ARAR | Applicable to discharge. |



Table 3. (page 2 of 2)

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | | |
|---|---|---|---|
| Regulation Application | ARAR | | Comments |
| Water Use Pertinent if stream or stream segment discharge. | Establishes water use designations for stream segments | ARAR | Applicable to |

| | | | |
|---|---|---|---|
| Designations for Great Miami River/ 3745-1-21 | within the Great Miami River Basin. | | |
| Location/Siting of New GW Wells/3745-9-04 | Mandates that groundwater wells be:<br>A) Located and maintained to prevent contaminants from entering the well.<br>B) Located to be accessible for cleaning and maintenance. | ARAR | Wells installed as part of the remedy will comply with this requirement. |
| Particulate Nondegradation Policy/3745-17-05 | Degradation of air quality in any area where air quality is better than required by 3745-17-02 is prohibited. | ARAR | Fugitive dust emission controls may be required during construction. Alternatives involving air emissions will be coordinated With USEPA and OEPA to ensure particulate emissions are within acceptable limits. |
| Open Burning Standards in Restricted Areas/3745-19-03 A-D | Open burning without prior authorization from OEPA is prohibited. | ARAR | |
| Disturbances Where Hazardous or Solid | Prohibits any filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility or solid waste has been ,damaged, either | ARAR | Implementation of the substantive provisions of state requirements relating |

Pertains to all groundwater wells on the site that either will be installed or have been installed since February 1975. Would pertain during the FS if new wells are constructed for treatability studies.

Pertains to sites in certain locations that may emit or allow the escape of particulates (both stack and fugitive).

Consider for sites that will undergo excavation, demolition, cap installation, clearing and grubbing, and incineration.

Pertains to sites within a restricted area (within the boundary of a municipality and a zone extending beyond such municipality).

Pertains to any site where hazardous or

| | | | |
|---|---|---|---|
| Waste Facility Was Operated/ Located/3734.02 H | solid waste facility was operated without prior authorization from the director of the USEPA. Special terms to conduct such activities may be imposed by the director to protect the public and the environment. | to intrusive activities at former disposal sites as ARARs is required by Section 121 (d) of CERCLA. | Does not pertain to areas that have had one-time leaks or spills. |

ARAR - applicable or relevant and appropriate requirement
CERCLA - Comprehensive Environmental Response. Compensation, and Liability Act
DWQPA - Department of Water Quality Planning and Assessment
FS - Feasibility Study
OEPA - Ohio Environmental Protection Agency
USEPA - U.S. Environmental Protection Agency



Table 4. State Action-Specific ARARs for OU 1

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | Regulation Application | ARAR | Comments |
|---|---|---|---|---|
| Prohibits Violation of Air Pollution Control Rules/3704.05 A-I | Prohibits emission of an air contaminant in violation of Section 3704 or any rule, permit, order, or variance issued pursuant to that section of the ORC. | May pertain to any site where air contaminant emissions occur either as a preexisting condition of the site or as a result of remedial activities. Should be considered for virtually all sites. | ARAR | Implementation of the substantive provisions of state air requirements as ARARs is required by Section 121 (d) of CERCLA. |
| "Digging" Where Hazardous or Solid Waste Facility Was Located/3734.02 H | Filling, grading, excavating, building, drilling, of mining on lend where a hazardous waste or solid waste facility was operated is prohibited without prior authorization from the director of the OEPA. | Pertains to any site where hazardous or solid waste is located | ARAR | Implementation of the substantive provisions of state requirements relating to intrusive activities at former disposal sites as ARAR4 is required by Section |

| | | | |
|---|---|---|---|
| 121 (d) of CERCLA. | | | |
| Air Emissions from Hazardous Waste Facilities/3734.02 I (D)(6)(c) | No hazardous waste facility shall emit any particulate matter, dust, fumes, gas, mist, smoke, vapor, or odorous substance that interferes with the comfortable enjoyment of life or property or that is injurious to public health. | ARAR | Pertains to any site where hazardous waste will be managed so that air emissions may occur. Consider for sites that will undergo movement of earth or incineration. Air emissions may be involved as part of the treatment in several of the alternatives. Alternatives involving air emissions will be coordinated with USEPA and OEPA to ensure emissions are within acceptable limits. |
| Handling Low-Level Radioactive Waste Prohibited/ 3734.02.7 A,B | A) Prohibits commingling low-level radioactive waste with any type of solid, hazardous, or infectious waste.<br>B) No owner or operator of a solid, infectious, or hazardous waste facility shall accept, any radioactive waste for transfer, storage, treatment, or disposal. | ARAR | Pertains to all sites where low-level radioactive wastes generated as part of radioactive waste is located. Radioactive wastes generated as part of remedial actions at OU 1 will be managed separately from non-radioactive materials. |
| Prohibits Open Dumping or Burning/ 3734.03 | Prohibits open burning or open dumping of solid waste or treated or untreated infectious waste. | ARAR | Pertains to any site at which solid waste has come to be located or will be generated during a rememdial action. Solid wastes generated as part of the remedy will be subject to this requirement. |
| Hazardous Waste Facility Environmental Impact/3734.05 (D)(6)(c) | A hazardous waste facility Installation end operation permit shall not be approved unless the facility is proven to represent the minimum adverse environmental impact considering the state of available technology, the nature and economics of various alternatives, and other pertinent considerations. | ARAR | Pertains to all sites where hazardous wastes are located and/or where hazardous wastes will be treated, stored, or disposed of. May function as siting criteria. While no permit is required, remedial alternatives will be coordinated with the USEPA and OEPA. |

Table 4. (page 2 of 8)

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | Regulation Application | ARAR | Comments |
|---|---|---|---|---|
| Hazardous Waste Siting Criteria/ 3734.05 (D)(6)(d)(g)(h) Pertains to all sites at which hazardous waste has come to be located end/or at which hazardous will be treated, stored, or disposed of. May function as siting criteria. | (D)(6)(d). A hazardous waste facility installation and operation permit shall not be approved unless it proves that the facility represents the minimum risk of all of the following:<br>(i) Contamination of ground and surface waters.<br>(ii) Fires or explosions from treatment, storage, or disposal methods.<br>(iii) Accident during transportation.<br>(iv) Impact on public health end safety.<br>(v) Soil contamination.<br><br>(D)(6)(g)(h). Prohibits the following location for treatment, storage and disposal of acute hazardous waste:<br>(i) Within 2.000 feet of any residence, school, hospital, jail, or prison.<br>(ii) Any naturally occurring wetland.<br>(iii) Any flood hazard area.<br>(iv) Within any state park or national park or recreation area. | us ARAR | | |
| Conditions for Disposal of Acute Hazardous Waste/3734.14.1 Pertains to any site where acute hazardous waste has come to be located. only one available information. landfill, beryllium machining wastes, may be determined to be an acute hazardous waste. Currently, there is some question whether such wastes would have been considered off- | Prohibits disposal of acute hazardous waste unless it: (1) cannot be treated, recycled, or destroyed; (2) has been reduced to its lowest level of toxicity; and (3) has been completely encapsulated or protected to prevent leaching. | ARAR | Based on waste disposed the sanitary | |

specification commercial chemical products, identifiable as P015 listed acute hazardous wastes. If such a listing is appropriate, this standard will be regarded as ARAR for any alternatives involving generation of listed beryllium hazardous wastes.



Table 4. (page 3 of 8)

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | Regulation Application | ARAR | Comments |
|---|---|---|---|---|
| Analytical and Collection Procedures/3746-1-03 | Specifies analytical methods and collection procedures for surface water discharges. | Pertains both to discharges to surface waters as a result of remediation and to any onsite surface waters affected by site conditions. | ARAR | Alternatives involving direct discharge will comply. |
| Water Quality Criteria/ 3745-1-07 C | Establishes water quality criteria for pollutants that do not have numerical or narrative criteria identified in Tables 7-1 through 7-15 of this rule. | Pertains both to discharges to surface waters as a result of remedial action and to any surface waters affected by site conditions. | ARAR | Alternatives involving direct discharge win comply. |
| Water Use Designations for Southwest Ohio | Establishes water use designations for stream segments within the Southwest Ohio Tributaries Basin. | Pertinent if stream or stream segment is onsite and is affected by site conditions or if remedy includes direct discharge. | ARAR | Applicable to |

| | | | |
|---|---|---|---|
| Tributaries/3745-1.17 discharge. Used by DWQPA to establish waste load allocations. | | | |
| Water Use Designations for Great Miami River13746-1-21 | Establishes water use designations for streams segments within the Great Miami River Basin. | ARAR | Pertinent if stream or stream segments involving direct discharge will is onsite and is affected by site conditions or if remedy includes direct discharge. Used by DWQPA to establish waste load allocations. Alternatives comply |
| Location/Siting of New GW Wells/ 3745-9-04 A,B | Mandates that groundwater walls be:<br>A) Located and maintained to prevent contaminants from entering the wall.<br>B) Located to be accessible for cleaning and maintenance. | ARAR | Pertains to all groundwater wells on the site that either will be installed or have been installed sam February 1975. Would pertain during the FS if new wells are constructed for treatability studies. Will be applied for new well installation as part of any alternatives. |
| Construction of New GW Wells/ 3745-9-05 A1 ,B-H | Specifies minimum construction requirements for new groundwater wells with regard to elskeg material, casing depth, potable water, annular spaces, use of drive shoe, openings to allow water entry, and contaminant entry. | ARAR | Pertains to all groundwater wells on the site that either will be installed or have bean Installed since 15 February 1975. Would pertain during the FS if new wells are constructed for treatability studies. Will be applied for new well installation as part of any alternatives. |

| Regulation Title Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | Regulation Application | ARAR | Comments |
|---|---|---|---|---|
| Casing Requirements for New GW Wells/ 3745-9-06 A,B,D,E | Establishes specific requirements for well casings, such as suitable material, diameters, and conditions. | Pertains to all groundwater wells on the site that either will be installed or have been installed since 15 February 1975. Would pertain during the FS if new wells are constructed for treatability studies. | ARAR | Will be applied for new well installation as part of any alternatives. |
| Surface Design of New of GW Wells/ 3745-9-07 A-F | Establishes specific surface design requirements, such as height above ground, well vents, and well pumps. | Pertains to all groundwater wells on the site that either will be installed or have been installed since 15 February 1975. Would pertain during the FS if new wells are constructed for treatability studies. | ARAR | Will be applied for new well installation as part of any alternatives. |
| Start-up and Operation of GW Wells/ 3745-9-08 A,C | Requires disinfection of new wells and use of potable water for priming pumps. | Pertains to all groundwater wells on the site that either will be installed or have been instified since 15 February 1975. Would pertain during the FS if new wefts are constructed for treatability studies. | ARAR | Will be applied for new well installation as part of any alternatives. |
| Maintenance and Operation of GW | Establishes specific maintenance and modification requirements for casing, pump, end wells in general. | Pertains to all groundwater wells on the site that either will be installed or | ARAR | Will be applied for new well installation as part of any |

| | | | |
|---|---|---|---|
| alternatives. Wells/ have been installed since 15 February 3745-9-09 A-C,D1,E-G 1975. Would pertain during the FS if new wells are constructed for treatability studies. | | | |
| Abandonment of Test Holes and GW Wells/ 3745-9-10 A,B,C | Following completion of use, wells and te Pertains to all groundwater wells on the site that either will be installed or have been installed since 15 February 1975. | ARAR | Will be applied for new well installation as part of any alternatives. |
| "De minisis" air contaminant source exemption/ 3745-15-05 | Provides that an air contaminant source is exempt from permitting requirements, provided it has the potential to emit no more than 10 pounds per day of criteria air pollutants or 1 ton per year of hazardous air pollutants. Pertains to any site emitting air pollutants. | ARAR | Will be applied to the potential to emit criteria or hazardous |



Table 4. (page 5 of 8)

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | | |
|---|---|---|---|
| Regulation Application | | ARAR | Comments |
| Air Pollution Nuisances Prohibited/ 3745-15-07 A | Defines air pollution nuisance as the emission or escape into the air (from any source) of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors, end nuisances. Consider for sites that will Pertains to any site that causes, or may reasonably cause, air pollution | ARAR | Air emissions may be involved as part of the treatment in several of the alternatives. |

| | | | | |
|---|---|---|---|---|
| Alternatives involving air undergo excavation, demolition, cap installation, methane production, incineration, and waste fuel recovery. | combination of the above that endanger health, safety, or welfare of the public or cause personal injury or property damage. Such nuisances are prohibited. | | | emissions will be coordinated with USEPA end OEPA to ensure emissions are within acceptable limits. |
| Emission Restrictions for Fugitive Dust/ emissions (non-attack) of dust. Consider for sites that will undergo grading, loading operations, demolition, clearing and grubbing, and construction. | All emissions of fugitive dust shell be controlled. | ARAR | Pertains to sites that may have fugitive | Air emissions may be involved as part of the treatment in several of the 3745-17-08 alternatives. Alternatives ismlying air A1 ,A2,B,D emissions will be coordinated with USEPA and OEPA to ensure fugitive dust emissions are within acceptable limits. |
| Open Burning Standards in Restricted Areas/3745-19-03 A-O | Open burning without prior authorization from OEPA is prohibited. | ARAR | Pertains to sites within a restricted area (within the boundary of a municipality end zone extending beyond such municipality). | |
| Ambient Air Quality Standards and Guidelines/ 3745-21-02 A,B,C | Establish specific air quality standards for carbon monoxide, ozone and non-mathane hydrocatbond. | ARAR | Pertain to any site that will emit carbon oxides, ozone, or non-methane hydrocarbons. Consider for sites that will undergo water treatment, incineration, and fuel burning (waste fuel recovery). | Alternatives involving air emissions will be coordinated with USEPA and OEPA to ensure emissions are within acceptable limits. |
| Methods of Ambient Air Quality | Specifies measurement methods to determine ambient air quality for carbon monoxide, ozone, and non-methane | ARAR | Pertains to any site that will emit | Alternatives involving air antiasians will |

| | | | |
|---|---|---|---|
| carbon monoxide, ozone, or non-<br>Measurement/<br>methane hydrocarbons. Consider for<br>3745-21-03 B,C,D<br>sites where treatment systems will<br>result in air emissions. | hydrocarbons. | | be coordinated with USEPA and OEPA to ensure emissions are within acceptable limits. |
| Non-degradation<br>Policy/3745-21-05 | Prohibits significant and avoidable deterioration of air quality. | ARAR | Alternatives involving air emissions will be coordinated with USEPA end OEPA to ensure emissions me within acceptable limits. |
| Pertains to any site that will emit<br>carbon oxides end non-methane<br>hydrocarbons. Consider for sites that<br>will undergo water treatment,<br>incineration, and fuel burning (waste<br>full recovery). | | | |



Table 4. (page 6 of 8)

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | | |
|---|---|---|---|
| Regulation Application | | ARAR | Comments |
| Organic Materials<br>Emission Control;<br>Stationary Sources/<br>3745-21-O7 A,B,G,I,J | Requires control of emissions of organic materials from stationary sources and best a available technology. | | |
| Pertains to any site that is emitting or<br>will emit organic material. Consider for<br>sites that will undergo water<br>treatment, incineration, and fuel<br>burning (waste fuel recovery). | | ARAR | Alternatives involving air emissions will be coordinated with USEPA and OEPA to ensure organic materials emissions we within acceptable limits. |

| | | | |
|---|---|---|---|
| VOC Emissions Control: Stationary Sources/3745-21-09 | Establishes limitations for emissions of VOCe from stationery sources. Pertains to any site that is emitting or will emit VOCs. Consider for sites that will undergo water treatment. | ARAR | Alternatives involving air emissions will be coordinated with USEPA end OEPA to ensure VOC emissions are within acceptable limits. |
| Exemptions to Solid Waste Regulations/ 3745-27-03 B | Defines exemptions to solid waste regulations and establishes limitations on temporary storage of putrescible waste or any solid waste that causes e nuisance or health hazard. Storage of putrescible waste beyond 7 days is considered open dumping. Pertains to any site where solid waste will be managed. Consider especially for old landfills where solid waste may be excavated and/or consolidated. | ARAR | Will be applied to any alternative that involves generation of solid wastes. |
| Authorized, Limited and Prohibited Solid Waste Disposal/ 3745-27-O5 A,B,C | Establishes allowable methods of solid wests disposal: sanitary landfill, incineration, composting. Prohibits management by open burning and open dumping. Pertains to any site where solid wastes will be managed. Prohibits management by open burning and open dumping. | ARAR | Will be applied to any alternative that involves generation of solid wastes. None of the alternatives involve open burning or open dumping. |
| Sanitary Landfill - Ground Water Monitoring/ 3745-27-1 0 B-D | Groundwater monitoring program must be established for all sanitary landfill facilities. The system must consist of sufficient number of wells that are located as that samples indicate both upgradient (background) and downgradient water samples. The system must be designed per the minimum requirements specified in this rule. The sampling and analysis procedures used must comply with this rule. Pertains to any new solid waste facility and any expansions of existing solid waste landfills offsite. Also may pertain to existing areas of contamination that are capped in-place per the solid waste rules. | ARAR | Groundwater monitoring is contemplated as an element of the remedy. |
| Disturbances Where drilling, | Prohibits any filling, grading, excavating, building, Pertains to say site where hazardous | ARAR | The RD/RA Work Plan will comply with |

| | | | |
|---|---|---|---|
| Hazardous or Solid | or mining on land where a hazardous waste facility or | | |
| or solid waste has been managed, | | | this |
| requirement. | | | |
| Waste Facility Was | solid waste facility was operated without prior | | |
| either intentionally or otherwise. Does | | | |
| Operated/ | authorization from the director of the USEPA. Special | | |
| not pertain to areas that have had one- | | | |
| 3745-27-13 C | terms to conduct such activities may be imposed by the | | |
| time leaks or spills. | | | |
| | director to protect the public and the environment. | | |



Table 4. (page 7 of 8)

| Regulation Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | | |
|---|---|---|---|
| Regulation Application | ARAR | | Comments |
| Post-Closure Care of | Specifies the required post-closure care for solid waste | | |
| Substantive requirements pertain to | ARAR | | Evaluation of existing closed sanitary |
| Sanitary Landfill | facilities. Includes continuing operation of leachate and | | |
| newly created solid waste landfills | | | landfill |
| conditions will be included in all | | | |
| Facilities/ | surface water management systems, maintenance of the | | |
| ontsite, expansions of existing solid | | | but the no- |
| action alternative and | | | |
| 3745-27-14 A | cap system, and groundwater monitoring. | | |
| waste landfills onsite, and existing | | | necessary |
| modifications/repairs win be | | | |
| areas of contamination that are capped | | | made. |
| per the solid waste rules. | | | |
| Water/Air Permit | A permit to install or plans must demonstrate best | | |
| Pertains to any site that will discharge | ARAR | | Alternatives involving onsite water |
| Criteria for Decision by | available technology end shall not interfere with or | | |
| to onsite surface water or will emit | | | discharge will comply. Air emissions may |
| the Director/ | prevent the attaintment or maintenance of applicable | | |
| contaminants into the air. | | | be involved as part of the treatment in |
| 3745-31-05 | ambient air quality standards. | | |
| several of the alternatives. Alternatives | | | |

| | | | |
|---|---|---|---|
| involving air emissions will be coordinated with USEPA and OEPA to ensure emissions are within acceptable limits. | | | |
| Evaluation of Wastes/ Pertains to sites where wastes of any type (both solid and hazardous) are located. | Any person generating a waste must determine if that waste is a hazardous waste (either through listing or by characteristic). | ARAR | Any materials generated during construction or implementation of remedial actions will be evaluated to determine if it is identifiable as a hazardous waste, or if it is sufficiently similar to a hazardous waste that hazardous waste management standards should be applied. |
| Prohibition of Nuisances/3767.14 Pertains to all sites located adjacent to lakes, streams, or drains. | Prohibition against throwing refuse, oil, or filth into lakes, streams, or tirelee. | ARAR | |
| Acts of Pollution Prohibited/6111.04 Pertains to any site that has contaminated onsite surface water or groundwater of will have a discharge to onsite surface water or groundwater. | Pollution of waters of the state is prohibited. | ARAR | Implementation of the substantive provisions of state water requirements as ARARs is required by Section 121 (d) of CERCLA. |
| Rules Requiring Compliance with National Effluent Stds/ 6111.O4.2 Pertains to any site that will have a point source discharge. | Establishes regulations requiring compliance with national effluent standards. | ARAR | Alternatives involving onsite discharge will comply. |

| Regulations Title or Subject/Revised Code Section and Pertinent Paragraph | Regulation Description | | Comments |
|---|---|---|---|
| Regulation Application | | ARAR | |
| Water Pollution Control Requirements- Duty to Comply/6111.07 A,C | Prohibits failure to comply with requirements of sections 6111.01 to 6111.08 or any rules, permit, or order issued under those sections. | ARAR | Implementation provisions of ARARs is CERCLA. |
| Pertains to any site that has contaminated groundwater or surface water or wilt have discharge to onsite surface or groundwater. | | | |
| OEPA Policy #DSW-DERR 0100.027 Establishes guidelines for the disposal of wastewaters, of both short-and long-term discharge categories, resulting from cleanup response action sites contaminated with VOCs, and the operating interface between the involved OEPA divisions. For utilizing BATT/BADCT for discharges to surface water or storm sewers, the Best Available Treatment Technology/Best Available Demonstrated Control Technology (BATT/BADCT) must be applied to | National Pollution Discharge Elimination System: Wastewater Discharges Resulting from Clean-up of Response Action Sites Contaminated with VOCs. | TBC, Not ARAR | This policy addresses short-term discharges (pump tests end treatability tests) and long-term discharges (interim and remedial actions). This policy provides guidelines for achievement of less that 5 æg/L for specific VOC parameters by those compounds. BATT/BADCT consists of air stripping, carbon columns. or both or equivalent to achieve the 5 æg/L or lees. |

achieve 5/æg/L or less for each VOC

parameter listed.

ARAR - applicable or relevant and appropriate requirement
CERCLA - Comprehensive Environmental Response. Compensation, and Liability Act
DWQPA - Department of Water Quality Planning and Assessment
FS - feasibility study
æg/L - micrograms per liter
OEPA - Ohio Environmental Protection Agency
ORC - Ohio Revised Code
TBC - to O be considered
USEPA - U.S. Environmental Protection Agency
VOC - volatile organic compound



Table 5. Federal Action-Specific ARARs for OU 1

| Action | Requirement | Prerequisite | Citation | ARAR | Comments |
|---|---|---|---|---|---|
| Discharge of Treatment System Effluent will comply. | Best Available Technology: ARAR<br>Use of best available technology economically achievable is required to control toxic and nonconventional pollutants. Use of best conventional pollutant control technology is required to control conventional pollutants. Technology-based limitations may be determined on a case-by-case basis. | Point source discharge to waters of the United States. Alternatives involving discharges to surface waters | 40 CFR 122.44(a) | | |
| | Water Quality Standards:<br>Must comply with applicable federally approved state water quality standards. Whole standards may be in addition to or more stringent than other federal standards under the CWA. | Alternatives involving discharges to surface waters | 40 CFR 122.44 and state regulations approved under 40 CFR 131 will comply. | | |
| | Discharge limitation must be established at more stringent levels than technology-based standards for | | 40 CFR 122.44 9(o) | | |

| | | | | |
|---|---|---|---|---|
| | toxic pollutants.<br><br>Best Management Practices:<br>Develop and implement a best management practices program to prevent the release of toxic constituents to surface waters.<br><br>The best management practices program must: | | | |
| 40 CFR 125.104 | - Establish specific procedures for the control of toxic and hazardous pollutant spills.<br><br>- Include prediction of direction, rate of flow, and total quantity of toxic pollutants where experience indicates a reasonable potential for equipment failure.<br><br>- Ensure proper management of solid and hazardous waste in accordance with regulations promulgated under RCRA. | | | |



Table 5. (page 2 of 3)

| Action | Requirement | | Prerequisite |
|---|---|---|---|
| Citation | ARAR | Comments | |
| Discharge of Treatment System Effluent (cont.) | Management Requirements:<br>Discharge must be monitored to ensure compliance. Discharge will monitor:<br><br>- The mass of each pollutant. | | |
| 40 CFR 136.1-136.4 | - The volume of effluent.<br><br>- Frequency of discharge and other measurements as appropriate. | | |
| 40 CFR 122.41 (i) | | | |

| | | | |
|---|---|---|---|
| | Approved test methods for waste constituent to be monitored must be followed. Detailed requirements for analytical procedures and quality controls are provided.<br><br>Comply with additional substantive conditions such as:<br><br>- Duty to mitigate any adverse effects of any discharge.<br><br>- Proper operation and maintenance of treatment systems. | | |
| 40 CFR 268 (Subpart D) | Movement of excavated materials to new location and placement in or on land will trigger and disposal restrictions for the excavated waste or closure requirements for the unit in which the waste is being placed. | Materials containing RCRA hazardous wastes subject to land disposal restrictions are placed in another unit. | |
| See Closure in this exhibit. | The area from which materials are excavated may require cleanup to levels established by closure requirements. | RCRA hazardous waste placed at site after the effective date of the requirements. | |
| Discharge to Storm Sewers<br>40 CFR 122<br>40 CFR 125 | Requires storm water discharges to be permitted under the federal (or state) NPDES program. Different requirements are applicable for different classes and types of discharges. | ARAR | Protection of surface waters against degradation resulting from site discharges.<br><br>Alternatives involving onsite discharge to sewer systems will comply. |



Table 5. (page 3 of 3)

| Action | Requirement | Prerequisite | Comments |
|---|---|---|---|
| Discharge of Water into | An NPDES permit is required for discharging water offsite into surface | ARAR | Protection of surface waters against degradation resulting<br><br>Alternatives involving onsite |

| | | | |
|---|---|---|---|
| 40 CFR 125 | | discharge will comply. | |
| Surface Water Bodies | water bodies. All surface water discharges must be in compliance with promulgated Ohio Stream Discharge Standards | | from site discharges. |

ARAR - applicable or relevant and appropriate requirement
CWA - Clean Water Act
NPDES - National Pollutant Discharge Elimination System
RCRA - Resource Conservation and Recovery Act



ATTACHMENT C

COMMUNITY RELATIONS
ACTIVITIES FOR OU 1, AREA B

MOUND

<IMG SRC 0595292H> Operable Unit 1/Area B

Environmental
Restoration
Program Ken Hacker, Manager

September 1994

Addresses possible volatile organic chemical contamination of the portion of the Buried Valley Aquifer which underlies the southwest corner of the original Mound Plant.

OU1 covers four acres and includes an historic landfill, the site sanitary landfill and an overflow pond.

<IMG SRC 0595292I>

The main concerns at this site are volatile organic compounds that may be migrating into the

groundwater. It is believed that such contamination originates from the historic landfill site that was formerly used for open burning and waste disposal.

PURPOSE

Determine possible contamination of the Buried Valley Aquifer from
- historic landfill containing:
  - Mound Plant used this area as burn area to dispose of solid and liquid wastes
  - Empty crushed thorium drums burial in this area in 1955 and 1956
- sanitary landfill
  - Built in 1977 with materials excavated during construction of overflow pond
  - Constructed over site of encapsulated waste relocated from historic landfill
- overflow pond (stormwater retention pond)

Gather enough information from this area to determine if a cleanup is necessary and, if so how best to proceed with the remedial action.

PRIMARY CONTAMINANTS OF CONCERN

Volatile organic compounds (VOCs)

WORK SCOPE

Determine by use of soil sampling, soil gas surveys and hydrogeology surveys, whether contaminants found in Area B are being carded off-site through groundwater.

PROGRESS TO DATE

Subsurface soil sampling and soil gas sampling to identify contaminants in the soil, August-December, 1992
Installation of 27 monitoring wells and piezometers. October-March, 1993
Aquifer pump test conducted using newly-installed and existing Test wells to characterize groundwater flow in the immediate vicinity of Area B. May-June, 1993
Fieldwork for RI/FS complete after aquifer pump test

DOCUMENTS IN PUBLIC REPOSITORY

History of Area B (February, 1991)
Proposal for Additional Work (September, 1992)
Remedial Investigation Report (RI) (July, 1994)

SCHEDULE FOR REMAINDER OF 1994

FSR/Proposed Plan to be complete in calendar year 1994
Begin work on Record of Decision (ROD)

<IMG SRC 0595292J>

FUTURE SCHEDULE MILESTONES (Fully Funded)

FY95 Prepare Feasibility Study/prepare Proposed Plan
Complete FSR/PP

FY96: Begin work on Remedial Design

Complete Record of Decision (ROD)
Begin work on RD/RA Work Plan

For more information, contact: EG&G Mound Community Relations at (513) 865-4140

<IMG SRC 0595292K>

<IMG SRC 0595292L>

MOUND

<IMG SRC 0595292M> Operable Unit 1/Area B

Environmental Restoration Program

Ken Hacker, Manager
FACT SHEET

November 1994

DOE Issues a Proposed Plan

Operable Unit 1 (OU1). Area B. of the Mound Plant occupies approximately four acres the southwestern portion of the plant site. This area of the plant is located over the eastern side of the Buried Valley Aquifer (BVA) which has been designated as a sole source aquifer by the U.S. EPA. From 1948 to 1977, Mound used Area B, formerly a gravel excavation area, for disposing of general trash and nonradioactive liquid waste. Solid wastes, mostly paper, office and kitchen garbage, were typically placed in a burn cage at Area B and Ignited to reduce their volume; liquid wastes, including solvents, oils, and chemicals were typically dumped or burned. Much of this waste was later relocated and encapsulated in a new site sanitary landfill constructed in 1977. At that time, an overflow pond for stormwater runoff was also constructed, partially covering the historic landfill site. After 1977, waste was no longer disposed of in Area B. Now, testing has revealed that the volatile organic compounds (VOCs) from the Area B historic landfill have migrated through softs and groundwater into a portion of the Buried Valley aquifer beneath the landfill. In addition, tritium was detected in past water samples taken from wells in Area B, although the concentration was below the drinking water maximum contaminant level.
Mound studies have shown the source of tritium in the BVA to be contaminated sediments in the Miami-Erie Canal. Thus, the environmental concerns in Area B center on VOCs in the contaminated soils and waste materials contained within the

<IMG SRC0595292N>

<IMG SRC0595292M>

area and on the groundwater system directly beneath and adjacent to the Mound site. The contaminated groundwater in OU1 is a concern at the site because of the potential for directly ingesting contaminants through drinking water and the possible offsite migration of the VOC-contaminated portion of the aquifer.

## Remedial Investigation and Feasibility Study Completed

To address VOC soil and water contamination concerns in Area B, a baseline risk assessment was done, followed by a remedial investigation and feasibility study (RI/FS). The baseline risk assessment was structure to address future public health risks, assuming no remedial actions were undo-taken. The study focused on exposure of hypothetical future residents and site workers to soft and groundwater contamination through inhalation, incidental ingestion, external exposure to radiation emitted from radionuclides in the soil, and skin contact with the soft. Ingestion and inhalation contribute almost all of the risk, and groundwater is the most important exposure medium. Because groundwater would contribute most of the carcinogenic and noncarcinogenic risks to future residents or workers, it is the focus of the remedial efforts to reduce the overall risk.

The (RI/FS) aimed seven alternatives for protecting human health and the environment while achieving the remedial goals. All seven of the alternatives include several common components. Each alternative includes surface controls, such as grading and lining existing ditches to manage runon and runoff; institutional controls, such as fencing and access restrictions to limit access to the site; and long-term groundwater monitoring. Each of the alternatives is discussed in the "Operable Unit 1 Proposed Plan." This and other documents on OU1 are available to the public in the CERCLA Reading Room at the Miamisburg Senior Adult Center.

## WHAT ARE VOLATILE ORGANIC COMPOUNDS?

Readers of Superfund Update may recall the feature article on volatile organic compounds (VOCs) in the January/February 1994 issue. VOCs compromise a wide array of everyday

## The Preferred Alternative

The preferred alternative for cleaning up the VOC-contaminated soils and groundwater at OU1 combines collection, treatment, and disposal. Because this alternative reduces the toxicity and volume of contaminated water and controls its migration, it is protective of both the Mound Plant well field and the Buried Valley aquifer. The action would effectively capture contaminated groundwater beneath the Operable Unit 1 site for treatment before it migrates

offsite. Treatment methods
chemicals. From gasoline, anti-
oxidation treatment, cas-
freeze; and pesticide sprays, to
A final selection of treat
paints, glues, and waxes-VOCs are
public comment period
found in household and industrial
current information, the
products all around us. Though
Environmental Protection
indispensable to modern life, VOCs
site after the public comment
can pose some significant hazards.
during this time will
And because they are so common,
they often turn up as contaminants in the environment. VOCs evaporate readily and so can quickly fill an enclosed space with noxious and dangerous fumes. They do not dissolve easily in water and so pose water contamination problems when they find their way to lakes, rivers, and streams. Long-term exposure to low concentrations can affect the liver, kidneys, heart, blood, reproductive organs, and nervous system. Some VOCs, such as benzene, are known to cause cancer. VOCs are released into the environment trough evaporation, accidental spills, leaks, or inadequate disposal methods. Drink - ing VOC-contaminated water, inhal ing evaporated VOCs, or absorbing VOCs through skin contact are the main exposure routes for humans.

The CERCLA statute currently considers 33 VOCs to be hazardous substances that may pose a potential hazard to human health or the environment if improperly treated, stored, transported, or disposed. At Mound, VOCs have been used in the past to clean or degrease metal parts, tools, molds, and other equipment. Among those in common use were acetone, benzene, chloroform, freon, and toluene.

If VOCs are discovered in soil or water in concentrations above fed-
eral or state standards, environ-
through December 30,
mental laws such as CERCLA re-
public comments on the
quire cleanup action. There are a
number of remedies for handling
VOC contamination in soil and
the Proposed Plan, at

for VOCs the could include ultraviolet (UV)
cade aeration, or conventional air stripping.
ment technologies will be done following the
during the remedial design phase. Based on
DOE, in consultation with the U.S. and Ohio
Agencies, will select a final remedy for the
period has ended and the information submitted
have been reviewed and considered.

<IMG SRC05952920>

Soil Sampling at Operable Unit 1

PUBLIC COMMENT PERIOD

Beginning November 15, 1994, and continuing
1994, the Department of Energy is accepting
Proposed Plan for Operable Unit 1.
The public is invited, and encouraged to review

groundwater. Contaminated soils can be covered with caps to eliminate potential exposure routes; excavated soil may be transported to a landfill or incinerator for disposal; soils may be treated in place by soil vapor extraction; VOC-contaminated groundwater may be pumped out for treatment and discharge.

hearing for OU1 on

Miamisburg Civic

Miamisburg, Ohio.

Senior Adult Center,

the CERCLA Public Reading Room, Miamisburg

305 Central Avenue, Miamisburg, Ohio.

Comments can be sent in writing to:

Jolene Walker
EG&G Mound Community Relations
P.O. Box 3000, OSE-245
Miamisburg, Ohio 4543-3000

The public can also give comments at a public

Thursday, December 8, 1994, at 7:00 p.m. in the

Center Council Chambers, 10 N. First Street,

For more information, contact: EG&G Mound Community Relations at (513) 865-4140.

MOUND

Operable Unit 1/Area B

<IMG SRC 0595292P>

Environment Restoration Program

Hacker, Manager
FACT SHEET #2

December 1994

Proposed Plan Supplementary Information

Based on official Public Comments received at the December 8, 1994, Public Meeting for Operable Unit 1 Proposed Plan, a question was raised concerning Table 1 on page 9 of the Proposed Plan. The question concerned the apparent similarity of Alternatives 3 and 4 with the exception of maximum total cost. The attachment clarifies Table 1 by summarizing the reduction of taxicity, mobility or volume of contaminants that each Alternative addresses. Alternative 4 was treated with best available technology for toxicity reduction. The State of Ohio believes that Alternative 3 does not meet those requirements.

Table 1 identifies the 7 primary evaluation criteria required by 40 CFR 300. This law also gives 2 additional "modifying criteria" which are (1) state acceptance and (2) community acceptance. Based on the States position on Alternative 3, chosen as the preferred

alternative. The final decision will also include evaluation of community acceptance based on public comments received.

Alternative 3 meets the mobility and volume reduction statutory preference for selecting remedial actions (page 4-10 of the Operable Unit 1 Feasibility Study). It does not address toxicity reduction, which is also a statutory preference for selecting remedial actions. Therefore, DOE in consultation with U.S. EPA and Ohio EPA, has determined that Alternative 4, which includes treatment to reduce toxicity, is preferable. The reduction of toxicity, mobility or volume for Alternative 4 is explained on page 4-14 of the Operable Unit 1 Feasibility Study.

Guidance from the Ohio Environmental Protection Agency states that waste water discharges resulting from cleanup of response action sites contaminated with volatile organic compounds (VOCs) need to be

Alternatives 3 through g comply with ARARs and achieve adequate protection of human health and the environment. These alternatives are correctly identified in Table 1 of the Proposed Plan, however, the text on page 8 of the Proposed Plan incorrectly stated that all alternatives met ARARs.

Please keep in mind that the Proposed Plan only identifies the preferred option for clean-up of contamination of Operable Unit 1. A more detailed description of the alternatives is provided in the Operable Unit 1 Feasibility Study.

Public Comment Period

The public comment period for the Proposed Plan has been extended to January 31, 1995. The public is invited, and encouraged, to review the Proposed Plan. Feasibility Study, and Supplementary Information, at the DOE Public Reading Room, Miamisburg Senior Adult Center, 305 Central Ave., Miamisburg, Ohio. For questions or comments, contact EG&G Community Relations at (513) 865-4140.

Table 1. Summary of Remedial Action Alternative Comparison

| | Protects Human Health and the | Reduces | Complies With | Short-term | Long-term |
|---|---|---|---|---|---|

| Alternative | Short Title | ARARs | Effectiveness | Effectiveness |
|---|---|---|---|---|
| Environment | TMV | Implementability | Total Cost | |
| 1 | No Action | No | No | No |
| No | No | Easy | $ 0 | |
| 2 | Institutional | No | No | No |
| No | No | Easy | $ 3,980,000 | |
| 3 | Collect/ | Yes | Adequatea | Yes |
| Adequate | Yes | Less Difficult | $262,000ø | |
| | Disposal | | | |
| MV | | | | |
| 4 | Collect/Treat/ | Yes | Adequatea | Yes |
| Adequate | Yes | Less Difficult | $ 1,740,000ø | |
| | Disposal | | | |
| TMV | | | | |
| 5 | Collect/Treat/ | Yes | Adequateb | Yes |
| Adequate | Yes | Less Difficult | $ 2,390,000ø | |
| | Disposal/Cap | | | |
| TMV | | | | |
| 6 | Contain/Collect/ | Yes | Adequateb | Yes |
| Adequate | Yes | Moderately | $ 2,650,000ø | |
| | Treat/Disposal/ | | | |
| TMV | Difficult | | | |
| 7 | Contain/Collect/ | Yes | Adequateb | Yes |
| Adequate | Yes | Moderately | $ 3,300,000ø | |
| | Treat/Disposal/ | | | |
| TMV | Difficult | | | |
| | Cap | | | |
| 8 | In-situ GW | Yes | Adequateb | Yes |
| Adequate | Yes | More Difficult | $ 1,980,000ø | |
| | Treatment | | | |
| TMV | | | | |
| 9 | In-situ GW | Yes | Adequateb | Yes |
| Adequate | Yes | More Difficult | $ 2,630,000ø | |
| | Treatment/Cap | | | |
| TMV | | | | |

aQuicker implementation when compared to other alternatives.
bLonger construction time when compared to other alternatives.
øThis Total Cost is in addition to the Total Cost shown for Alternative 2 (common cost).
ARARs - Applicable or relevant and appropriate requirements.
TMV - Toxicity, Mobility, or Volume.

# *MOUND PLANT (USDOE)*

## Site Information:

**Site Name:** MOUND PLANT (USDOE)
**Address:** MIAMISBURG, OH

**EPA ID:** OH6890008984
**EPA Region:** 05

## Record of Decision (ROD):

**ROD Date:** 07/22/1999
**Operable Unit:** 11
**ROD ID:** EPA/541/R-99/110

**Media:** Groundwater, Soil

**Contaminant:** Base Neutral Acids, Dioxins/Dibenzofurans, Inorganics, Metals, PAH, Pesticides, Radioactive, VOC

**Abstract:** Please note that the text in this document summarizes the Record of Decision for the purposes of facilitating searching and retrieving key text on the ROD. It is not the officially approved abstract drafted by the EPA Regional offices. Once EPA Headquarters receives the official abstract, this text will be replaced.

The Mound Plant Site was placed on the CERCLA National Priorities List ( NPL) in 1989. The Department of Energy ( DOE) signed a CERCLA Section 120 Federal Facility Agreement with the USEPA, effective October 1990. A similar tripartite agreement was signed among the DOE, USEPA, and Ohio Environmental Protection Agency ( OEPA) in 1993. The Operable Unit 1 (OU1) Remedial Investigation/Feasibility Study ( RI/FS) was conducted between 1991 and 1994 to identify the types, quantities, and locations of contaminants and to develop ways of addressing the contamination problems.

The DOE Mound Plant is located within the city limits of Miamisburg, in Southern Montgomery County, Ohio. The site is approximately 10 miles south-southwest of Dayton and 45 miles north of Cincinnati. Miamisburg is predominantly a residential community with supportive commercial facilities and industrial development. The adjacent upland areas are used primarily for

residences and agriculture or are unused open spaces.
The Mound property is divided into 19 "release blocks," which are contiguous tracts of property designated for transfer of ownership. These 19 release blocks may be reconfigured to accommodate transfer of Mound property for economic development. As a result of historic disposal practices and contaminant releases to the environment, the Mound Plant was placed on the National Priorities List in November, 1989. The Department of Energy (DOE) signed a Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Federal Facility Agreement with US EPA, effective October 1990. DOE serves at the lead agency for CERCLA-related activities at this site.

Operable Unit (OU) 11:
OU 11 is Release Block (RB) H which is located in the northeast corner of the developed area of the plant. RB H is generally bound to the south by the main plant entrance, to the east by an offsite community golf course,
to the north by off-site residents, and to the west by a fenced parking lot. There are no structures in RB H. RB H includes one Potential Release Site (PRS) that has undergone previous investigation. Before transfer of a
release block can be completed, all buildings and PRSs must be evaluated for protectiveness to human health and the environment for industrial reuse or remediated to be protective.

A Record of Decision addressing OU 11 was completed in July, 1999.

Release Block (RB) D is located in the southeast corner of the developed area of the plant. RB D is bound to the south by the undeveloped portion of the Mound Plant (the "South Property"), to the east by offsite residences, to the north by a parking lot and group of small buildings, and to the west by a fenced area for storage of Investigative Derived Materials (IDM).

A Record of Decision addressing RB D was completed in February, 1999.

**Remedy:** The selected remedy for release block (RB) H is institutional controls in the form of deed restrictions on future land use. Specifically, the selected remedy includes: ensuring that industrial land use is maintained; prohibiting the use of bedrock groundwater; providing site access for federal and state agencies for the purpose of taking response actions including sampling and monitoring; and prohibiting removal of release block H soils from the Department of Energy (DOE) Mound property boundary without approval of the State, or their successor agencies. DOE, as the lead agency, has the responsibility to monitor, maintain and enforce these institutional controls. This responsibility includes the duty to conduct annual assessments of compliance with deed restrictions and the duty to enforce the deed restrictions if any non-compliance is detected.

The soils within RB H have not been evaluated for any use other than on-site industrial use. Any off-site disposition of the RB H soil without proper handling, sampling, and management could created an unacceptable risk to off-site receptors. An objective of the preferred alternative is to prevent residual exposure to soils from RB H.

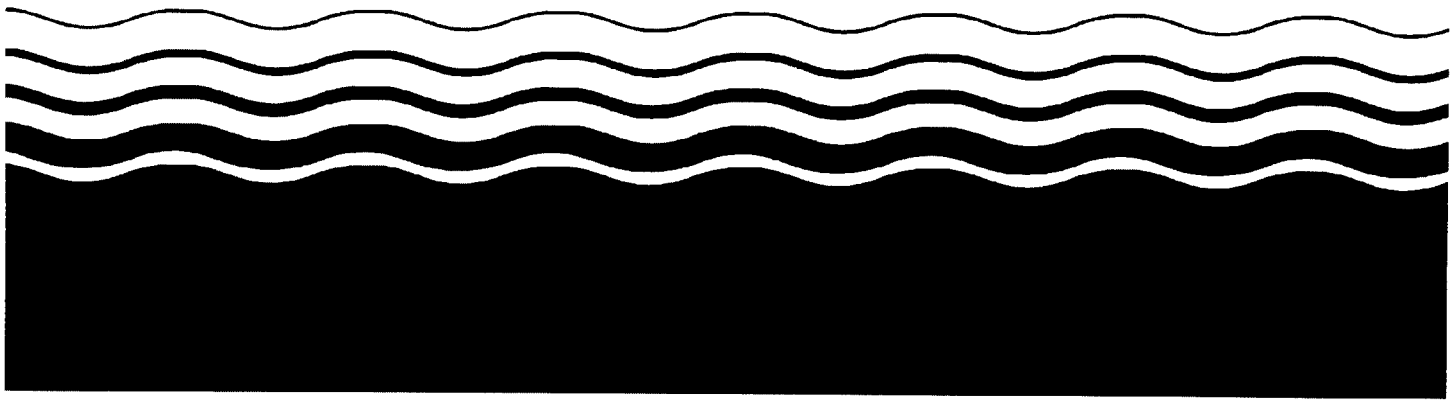
Estimated Capital Cost: Not Provided
Estimated Annual O&M Costs: $5,000
Estimated Present Worth Costs: Not Provided

**Text:** Full-text ROD document follows on next page.

EPA541-R99-110
1999

# EPA Superfund
# Record of Decision:

# Mound Plant (USDOE)
# Release Block H OU 11
# Miamisburg, OH
# 7/22/99



# Record of Decision for Release Block H, Mound Plant, Miamisburg, Ohio

**FINAL**

**June 1999**

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## ACRONYMS

| | |
|---|---|
| AOC | Area of Concern |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| BDP | Building Data Package |
| BVA | Buried Valley Aquifer |
| CERCLA | Comprehensive Environmental Response Compensation & Liability Act |
| COC | Chemical of Concern |
| DOE | Department of Energy |
| FFA | Federal Facilities Agreement |
| FOD | Frequency of Detection |
| GV | Guideline Value |
| HEAST | Health Effects Assessment Summary Table |
| HI | Hazard Index |
| HQ | Hazard Quotient |
| IDM | Investigative Derived Material |
| IRIS | Integrated Risk Information System |
| MEMP | Miamisburg Environmental Management Project |
| MMCIC | Miamisburg Mound Community Improvement Corporation |
| NCP | National Contingency Plan |
| NFA | No Further Assessment |

| | |
|---|---|
| NPL | National Priority List |

**ACRONYMS (continued)**

| | |
|---|---|
| OAC | Ohio Administrative Code |
| ODH | Ohio Department of Health |
| OEPA | Ohio Environmental Protection Agency |
| O&M | Operations and Maintenance |
| ORC | Ohio Revised Code |
| OSC | On-Scene Coordinator |
| OU | Operable Unit |
| pci | picocurie |
| PAH | Polynuclear aromatic hydrocarbon |
| PETREX | (trade name for a type of soil sampling) |
| PRS | Potential Release Site |
| RB | Release Block |
| RD/RA | Remedial Design/Remedial Action |
| RI/FS | Remedial Investigation/Feasibility Study |
| ROD | Record of Decision |
| RRE | Residual Risk Evaluation |
| RREM | Residual Risk Evaluation Methodology |
| SARA | Superfund Amendments and Reauthorization Act |
| SCM | Site Conceptual Model |
| SM/PP | Special Metallurgical/PIutonium Processing |
| US DOE | United States Department of Energy |
| US EPA | United States Environmental Protection Agency |
| UTL | Upper Tolerance Limit |

# Record of Decision (ROD) for Release Block H, Mound Plant, Miamisburg, Ohio

This Record of Decision (ROD) documents the remedy selected for Release Block H of the Mound Plant, Miamisburg, Ohio. The ROD is organized in three sections: a declaration, a decision summary, and a responsiveness summary.

## 1.0 DECLARATION

This section summarizes the information presented in the ROD and includes the data certification sheet and authorizing signature page.

### 1.1 Site Name and Location

The U.S. Department of Energy (US DOE) Mound Plant (CERCLIS ID No. 04935) is located within the City of Miamisburg, in southern Montgomery County, Ohio. The Plant is approximately ten (10) miles southwest of Dayton and 45 miles north of Cincinnati. This ROD addresses Release Block (RB) H which is located in the northeast corner of the developed area of the plant.

### 1.2 Basis and Purpose

This decision document presents the selected remedy for Release Block H (RB H) of the Mound Plant. The remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Contingency Plan (NCP). Information used to select the remedy is contained in the Administrative Record file. The file is available for review at the Mound CERCLA Reading Room, Miamisburg Senior Adult Center, 305 Central Avenue, Miamisburg, Ohio.

The State of Ohio concurs with the selected remedy.

## 1.3 Site Assessment

As documented in the Residual Risk Evaluation (RRE) for RB H and the Technical Position Report in Support of the RB H RRE, the risks from carcinogens and noncarcinogens to current and future occupants of RB H were evaluated. In those analyses, the type of occupant was limited to an industrial use scenario and was represented by a construction worker and a site employee (office employee). Based on the RRE, the risks for current industrial use are within the acceptable range. However, in order to ensure that future use of the site conforms to the RRE assumptions, it was necessary to consider a remedy that would prevent the site from being used for non-industrial purposes.

As described below, the remedy will protect future occupants of RB H from the threat of contaminants in the groundwater, and will ensure that RB H soils are appropriately evaluated prior to any removal of RB H soils from the Mound Plant National Priority List (NPL) facility boundary.

## 1.4 Description of Selected Remedy

The selected remedy for RB H is institutional controls in the form of deed restrictions on future land use. DOE or its successors, as the lead agency for this ROD, has the responsibility to monitor, maintain and enforce these institutional controls. In order to maintain protection of human health and the environment at RB H in the future, the institutional controls to be adopted will:

- Ensure that industrial land use is maintained;
- Prohibit the use of bedrock ground water;
- Provide site access for federal and state agencies for the purpose of taking response actions, including sampling and monitoring; and
- Prohibit removal of RB H soils from the DOE Mound property (as owned in 1998) boundary without approval from the Ohio Department of Health (ODH) and the Ohio Environmental Protection Agency (OEPA), or their successor agencies.

A copy of the deed is attached in Appendix A.

## 1.5 Statutory Determinations

The selected remedy for RB H is protective of human health and the environment,

complies with Federal and State requirements that are applicable or relevant and appropriate (ARAR), is cost-effective, and utilizes a permanent solution to the maximum extent practicable. Because this remedy will result in hazardous substances remaining in Release Block H above levels that allow for unlimited use and unrestricted exposure, DOE, in consultation with the U.S. Environmental Protection Agency (US EPA), OEPA and ODH, will review the remedial action each year to assure that human health and the environment are being protected by the remedial action being implemented. DOE reserves the right to petition the US EPA, OEPA, and ODH for a modification to the frequency established for conducting the effectiveness reviews.

## 1.6 ROD Data Certification Checklist

Based on a commitment made by the U.S. Environmental Protection Agency (US EPA) to the General Accounting Office, RODs must contain a checklist which certifies that key information regarding the selection of the remedy has been included in the ROD. Therefore, note that the following information is located in the Decision Summary (Section 2) of this ROD. Additional information on any of these topics can be found in the Administrative Record for Mound.

- chemicals of concern (COCs) and their respective concentrations,
- guideline levels for the COCs;
- risks represented by the COCs;
- current and future land and groundwater use assumptions used in the risk assessment and ROD;
- land and groundwater uses that will be available at the site as a result of the remedy;
- estimated cost of the remedy; and the
- decisive factor(s) that led to the selection of the remedy.

## 1.7 Authorizing Signatures and Support Agency Acceptance

This Record of Decision for Release Block H of the Mound Plant has been prepared by the DOE. Approval of the US EPA and OEPA is required and has been secured as documented below.

This ROD is authorized for implementation.

G. Leah Dever
Ohio Field Office Manager,
U. S. Department of Energy

6/18/99
Date

William E. Muno
Director, Superfund Division,
U. S. Environmental Protection Agency, Region V

7/14/99
Date

Christopher Jones
Director,
Ohio Environmental Protection Agency

7/22/99
Date

## 2.0 DECISION SUMMARY

This section provides an overview of the site and the alternatives evaluated. The selected remedy, and the basis for its selection, are also described.

### 2.1 Site Description

The DOE Mound Plant (CERCLIS ID No. 04935) is located within the city limits of Miamisburg, in southern Montgomery County, Ohio (Figure 2-1). The Site is approximately ten (10) miles south-southwest of Dayton and 45 miles north of Cincinnati. Miamisburg is predominantly a residential community with supportive commercial facilities and industrial development. The adjacent upland areas are used primarily for residences and agriculture or are unused open spaces.

The Mound property is divided into nineteen "release blocks," which are contiguous tracts of property designated for transfer of ownership. These nineteen release blocks may be reconfigured to accommodate transfer of Mound property for economic development.

This ROD addresses Release Block (1313) H (Figure 2-2) which is located in the northeast corner of the developed area of the plant. The legal description of RB H is reproduced in Appendix B. RB H is generally bound to the south by the main plant entrance, to the east by an offsite community golf course, to the north by off-site residents, and to the west by a fenced parking lot.

There are no structures in RB H.

### 2.2. Site History and Enforcement Activities

As a result of historic disposal practices and contaminant releases to the environment, the Mound Plant was placed on the National Priorities List (NPL) on November 21, 1989. DOE signed a Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Section 120 Federal Facility Agreement (FFA) with US EPA, effective October 1990. In 1993, this agreement was modified and expanded to include OEPA. DOE serves as the lead agency for CERCLA-related activities at Mound.

**Figure 2-1. Regional Context of the Mound Plant**

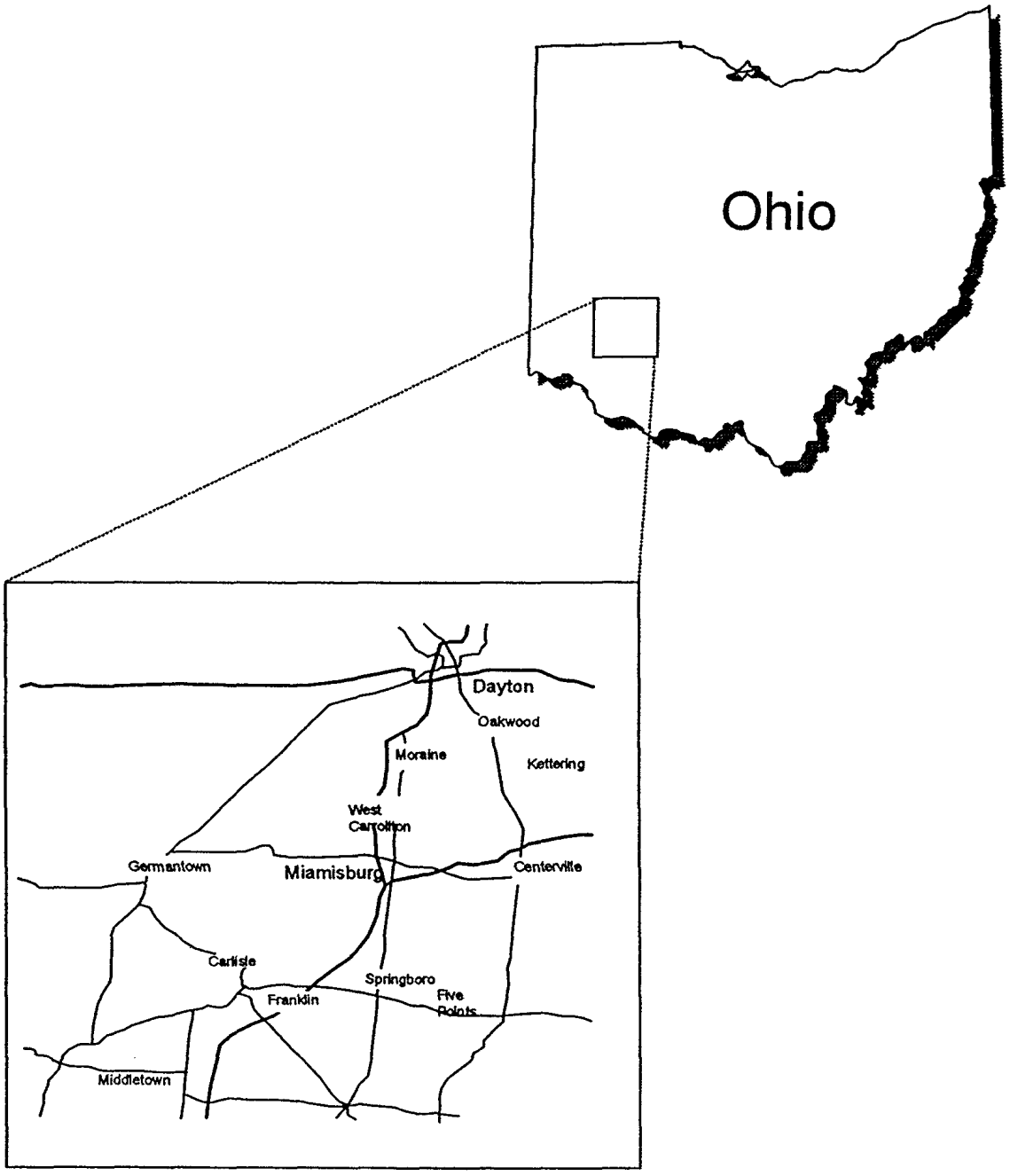
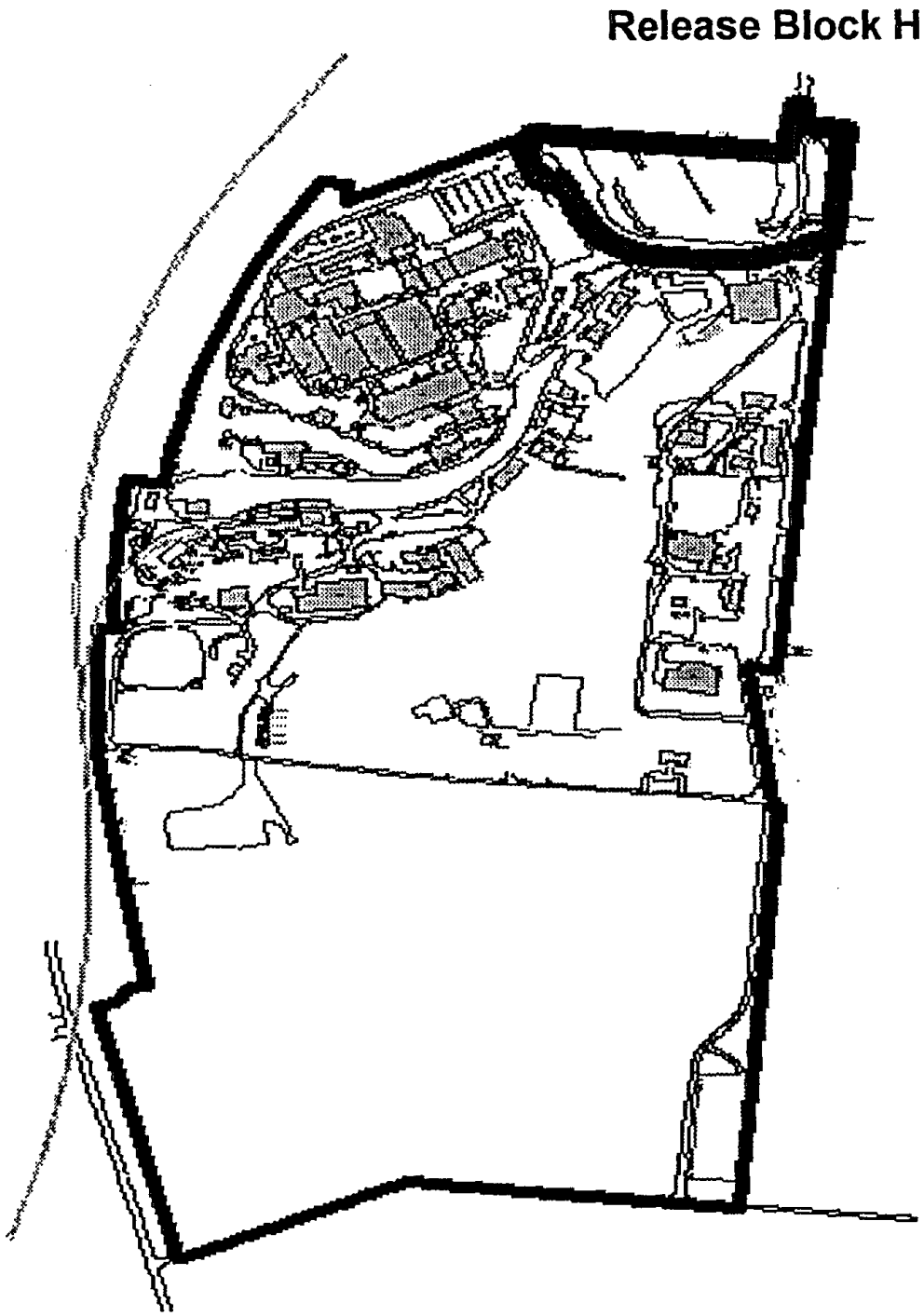


**Figure 2-2. Location of Release Block H**



DOE, US EPA, and OEPA had originally planned to address the Plant's environmental restoration issues under a set of Operable Units (OUs), each of which would include a number of Potential Release Sites (PRSs). For each OU, the site would follow the traditional CERCLA process: a Remedial Investigation/Feasibility Study (RI/FS), followed by a Record of Decision (ROD), followed by Remedial Design/Remedial Action (RD/RA). After initiating remedial investigations for several OUs, DOE and its regulators realized during a strategic review in 1995 that, for Mound, the OU approach was inefficient. DOE and its regulators agreed that it would be more appropriate to evaluate each PRS or building separately, use removal action authority to remediate them as needed, and establish a goal for no additional remediation other than institutional controls for the final remedy. To evaluate any residual risk after all removals have been completed, a residual risk evaluation is conducted to ensure the block or parcel is protective of human health for industrial reuse. This process was named the Mound 2000 process. DOE and its regulators pursued this approach with the understanding that US EPA and OEPA reserve all rights to enforce all provisions of the FFA and participation in the Mound 2000 process does not constitute a waiver of US EPA and OEPA rights to enforce the FFA.

The Mound 2000 process established a "core team" consisting of representatives of the Miamisburg Environmental Management Project (MEMP) of DOE, US EPA, and OEPA. The Core Team evaluates each of the potential contamination problems and recommends the appropriate response. The Core Team uses process knowledge, site visits, and existing data to determine whether or not any action is warranted concerning the possible problem area. If a decision cannot be made, the Core Team identifies specific information needed to make a decision (e.g., data collection, investigations). The Core Team also receives input from technical experts as well as the general public and/or public interest groups. Thus, all stakeholders have the opportunity to express their opinions or suggestions involving each potential problem area. The details of this process are explained in the “Workplan for Environmental Restoration at the Mound Plant, The Mound 2000 Approach," December 1998.

"The Mound 2000 Residual Risk Evaluation Methodology (RREM), Mound Plant, Final, Revision , January 6, 1997" was developed as a framework for evaluating human health risks associated with residual levels of contamination. The RREM is applied to a release block once necessary remediation has been completed, and the remaining PRSs or buildings in the release block have been designated as No Further Assessment (NFA). Once these environmental concerns have been adequately addressed by the Core Team, a residual risk evaluation (RRE) is performed. The RRE forms part of the basis for determining what restrictions should be placed on the site.

## 2.3 Community Participation

Opportunities to comment on the No Further Assessment (NFA) decision for PRS 93 and the residual risk documents for RB H were provided. A listing of those opportunities is shown in Table 2-1.

**Table 2-1. Public Comment Periods for Release Block H Documents**

| DOCUMENT (PRS/BUILDING) | COMMENT PERIOD (BEGIN) | COMMENT PERIOD (END) |
|---|---|---|
| **93** | 3/18/96 | 4/1/96 |
| **RB H Residual Risk Evaluation** | 4/30/97 | 6/16/97 |
| **Technical Position Report in Support of the Release Block H Residual Risk Evaluation** | 5/599 | 6/5/99 |

The Proposed Plan for RB H was made available to the public on May 5, 1999. Copies were distributed to stakeholders and were placed in the Administrative Record file in the CERCLA Public Reading Room, Miamisburg Senior Adult Center, 305 Central Avenue, Miamisburg, Ohio. The notice of the availability of the Plan was published in the ***Miamisburg News*** on May 5, 1999. A public comment period was held from May 5, 1999 through June 5, 1999. In addition, a public meeting was held on May 18, 1999 to present the Proposed Plan. Representatives of DOE, US EPA, and the OEPA were present at the public meeting to answer questions regarding the proposed remedy. Responses to comments received during the comment period and public meeting are included in the Responsiveness Summary, which is Section 3 of this ROD.

## 2.4 Scope and Role of RB H

RB H lies within what was once called Operable Unit 2 (OU2). RB H includes one Potential Release Site (PRS) that has undergone previous investigation. Before transfer of a release block can be completed, all buildings and PRSs must be evaluated for protectiveness to human health and the environment for industrial reuse or remediated to be protective. Any residual risks associated with remaining

contamination in RB H have been evaluated and presented in the RB H Residual Risk Evaluation (RRE) (August, 1997) and its supplement "Technical Position Report in Support of the Release Block H Residual Risk Evaluation, April, 1999."

The PRS in RB H was identified on the basis of actual measurements of contaminants. The location of the PRS within RB H is shown in Figure 2-3; its description appears in Table 2-2. As shown in Table 2-2, the PRS was determined by the Core Team to require no further assessment, although sampling and monitoring of the seep at PRS 93 will continue.

## 2.5 Site Characteristics

### 2.5.1 Geologic Setting

The bedrock section beneath Mound Plant consists of thin, nearly flat-lying beds of alternating shale and limestone of the Richmond Stage of the Cincinnati Group (Upper Ordovician -- about 450 million years ago). The Cincinnati Group is present at the surface at Mound Plant and underlies RB H. The limestone beds range from 2 to 6 inches in thickness and the shale layers are commonly 5 to 8 feet thick.

Pleistocene age (less than about 2 million years old) glacial deposits at Mound Plant include both till and outwash deposits. The till in the area of Mound Plant is composed of an unsorted, unstratified mixture of clay, silt, sand, and coarser material. Water-lain deposits consist of outwash composed of well-sorted sand and gravel. The sand and gravel is horizontally layered, and commonly cross-bedded. The outwash in the vicinity of Mound Plant occurs as restricted valley-train deposits that were formed by the aggregation of glacial meltwater streams. The outwash deposited in the Miami River Valley and the associated tributary valley forms the Buried Valley Aquifer (BVA) and contiguous deposits. A general discussion of the geology is presented in the "Remedial lnvestigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan, Final, May 1992."

### 2.5.2 Hydrogeologic Setting

There are two hydrogeologic regimes at Mound Plant: flow through the bedrock beneath the Main Hill and the Special Metallurgical/Plutonium Processing (SM/PP) Hill, and flow within the unconsolidated glacial deposits and alluvium associated with the BVA in the Great Miami River Valley and the tributary valley between the Main Hill

and SM/PP Hill. The BVA is a US EPA-designated sole source aquifer. The bedrock system, an interbedded sequence of shale and limestone, is dominated by fracture flow especially in the upper portions of the bedrock. Groundwater movement within the till and sand and gravel, within the buried valley, is through porous media. Groundwater flow from Mound Plant is generally to the west and southwest toward the BVA of the Great Miami River Valley. A discussion of the hydrogeology of Mound is presented in the OU9 Work Plan and the "Operable Unit 9; Hydrogeologic Investigation: Buried Valley Aquifer Report, Technical Memorandum, Revision 1 (September 1994)" and "Operable Unit 9 Hydrogeologic Investigation: Bedrock Report, Technical Memorandum, Revision (January 1994)."

### 2.5.3 Available Data for Release Block H

The PRS within RB H has been evaluated by the Core Team. The following sections discuss the data relevant to RB H that are available from the general source documents and the Potential Release Site package.

#### 2.5.3.1 Background Data

**Soils.** Background concentrations measure the amount of a chemical that is naturally occurring (like metals) or anthropogenic (man-made but, for purposes of evaluating background, originating from sources other than the Mound Plant). Background concentrations are used as a screening tool to determine which contaminants should be carried through a risk evaluation as described in Section 2.7 of the ROD. Regional background concentrations in soil were determined during investigations conducted in September 1994 and August 1995 and are documented in reports titled "Operable Unit 9 Background Soils Investigation Soil Chemistry Report" and "Operable Unit 9, Regional Soils Investigation Report."

**Groundwater.** Background concentrations for groundwater were developed from two sources of data. For the Buried Valley Aquifer, background values were reported in the April 1995 "OU9 Hydrologic Investigation: Groundwater Sweeps Report." Background concentrations for bedrock groundwater' were reported in the April 1995 "OU5 New Property Remedial Investigation Report."

**Figure 2-3. Location of PRS within RB H**

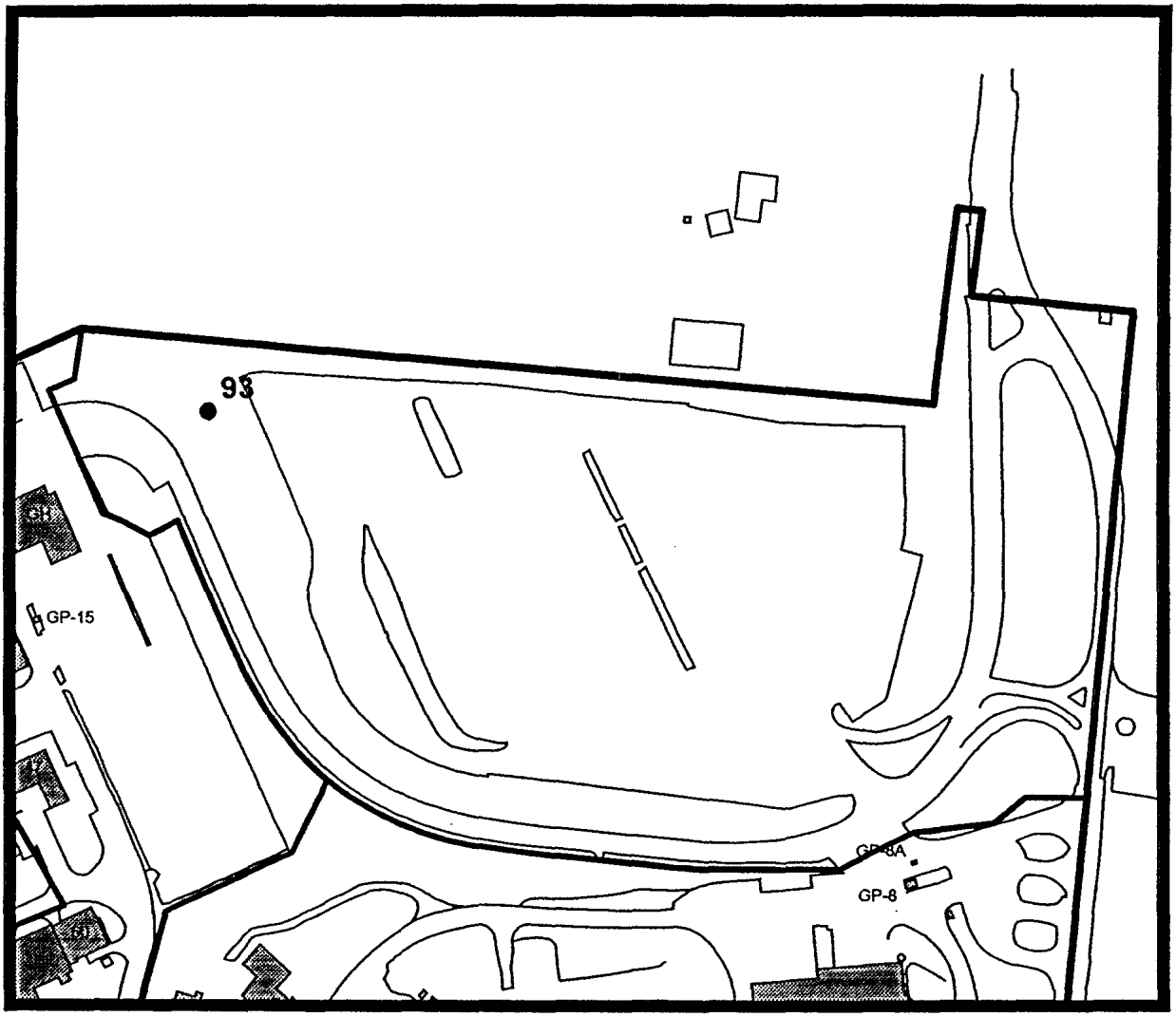


**Table 2-2. Release Block H PRS and Core Team Conclusions**

| PRS/ BLDG | Reason for Identification | Core Team Decision | Close Out of PRS/BDP |
|---|---|---|---|
| 93 | Main Hill Seep #0603 | Binned for No further Assessment | Recommendation for NFA with continued monitoring signed by Core Team on 3/4/96. |

### 2.5.3.2 Groundwater Contaminant Data

Groundwater data consist of water analyses of the Mound production wells screened within the Buried Valley Aquifer, and analyses of groundwater from monitoring wells screened in the bedrock aquifer on the Mound property. These wells are sampled as part of the site-wide groundwater monitoring network. Section 2.2.2 of the RRE for RB H documents the specific groundwater data used to evaluate the current and future groundwater profile for RB H. Summaries of the contaminants detected in Mound Plant groundwater, and those projected to be present in Mound Plant groundwater in the future, are shown in Tables 2-3 and 2-4, respectively.

### 2.5.3.3 Soil Contaminant Data

Soil data can be divided into three types: (1) data obtained through commercial analytical laboratory analysis; (2) data obtained through "screening" techniques conducted in a DOE laboratory; and, (3) data obtained through screening techniques conducted in the field. Analytical laboratory data are obtained using strict methods and are subjected to exacting quality control procedures. These data are of the highest quality, and are quantitative. The laboratory screening data are considered to be of lower quality because sample preparation does not occur, and the measuring instruments are less precise. The field screening techniques are the least accurate due to instrument limitations and the effects of ambient conditions on field measurements. Due to these limitations, field screening data were not used for any calculations in the RRE for RB H.

## Table 2-3. Current Mound Plant Groundwater Contaminants of Concern Based on the Plant Water Supply

| Groundwater Constituent | Maximum concentration | Screening Concentration (either background or G.V.) |
|---|---|---|
| **Organics (mg/L)** | | |
| 1,1-Dichloroethene | 0.0017 | --- |
| 1,1,1-Trichloroethane | 0.0018 | 0.0007[4] |
| 1,1,2,-Trichloro-1,2,2-trifluoroethane | 0.0087 | --- |
| **INORGANICS (mg/L)** | | |
| Cadmium | 0.0077 | 0.051[2] |
| Copper | 0.593 | 0.0012[4] |
| Lead | 0.040 | 0.0101[4] |
| **RADIONUCLIDES(pCI/L)** | | |
| Actinium-227 | 0.335 | 0.26[3] |
| Bismuth-210 | 0.39 | --- |
| Plutonium-239/240 | 2.0 | 0.125[4] |
| Thorium-228 | 2.17 | 0.69[3] |
| Tritium | 7200 | 1485[4] |
| Uranium-234 | 8.14 | 0.792[4] |
| Uranium-238 | 8.25 | 0.688[4] |

[1]- Guideline values (Gvs) are decision-making tools for the Core Team. Gvs help the Core Team determine if contaminants are present at levels that warrant evaluation.
[2]- Hazard Quotient for ingestion, dermal and inhalation. Decision made on 0.1xGV.
[3]- GV corresponds to a total risk of $10^{-6}$ for ingestion only.
[4]- Background value. When adequate numbers of measurements are available, background values are based on the 95$^{th}$ % upper tolerance limit.

Refernece: "Technical Position Report in Support of the Release Block H Residual Evaluation", Public Review Draft Rev 2, April 1999

## Table 2-4. Future Mound Plant Groundwater Contaminants of Concern

| Groundwater Constituent | Estimated Maximum concentration | Screening Concentration (either backgound or G.V.)[1] |
|---|---|---|
| **ORGANICS (mg/L)** | | |
| 1,1-Dichloroethene | 0.0017 | --- |
| 1,1,1-Trichloroethane | 0.0065 | 0.0007[4] |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 0.0087 | --- |
| INORGANICS (mg/L) | | |
| Beryllium | 0.0001 | 0.000066[5] |
| Bismuth | 0.0016 | --- |
| Cadmium | 0.0077 | 0.051[2] |
| Chromium | 0.4961 | 0.0061[4] |
| Cobalt | 0.0039 | --- |
| Copper | 0.5964 | 0.0012[4] |
| Lead | 0.040 | 0.010[4] |
| Molybdenum | 0.0096 | 0.0056[4] |
| **RADIONUCLIDES (pCi/L)** | | |
| Actinium-227 | 0.355 | 0.26[3] |
| Bismuth-210 | 0.39 | --- |
| Plutonium-239/240 | 2.02 | 0.125[4] |
| Thorium-228 | 2.17 | 0.69[3] |
| Tritium | 10427 | 1485[4] |
| Uranium-234 | 8.14 | 0.792[4] |
| Uranium-238 | 8.25 | 0.688[4] |

1- Guideline value (Gvs) are decision-making tools for the Core Team. Gvs help the Core Team determine if containments are present at levels that warrant evaluation.

[2]- Hazard Quotient for ingestion, dermal and inhalation. Decision made on 0.1xGV.

[3] - GV corresponds to a total risk of $10^{-6}$ for ingestion only.

[4] - Background value. When adequate numbers of measurements are available, background values are based on the 95th% upper tolerance limit.

[5]- Total Risk $10^{-6}$ for ingestion, dermal and inhalation

Reference: “Technical Position in Support o f the Release Block H Residual H Residual Risk Evaluation”, Public Review Draft Rev 2, April, 1999.

Soil contaminant data for RB H collected prior to the Mound 2000 process are documented in a number of DOE reports. These references include:

- Other Soils Characterization Report, Volume I - Text. Final, Revision O. May 1, 1995 (*results of systematic sampling),*

- OU-5 Operational Area Phase I Investigation Non-AOC Field Reports, Volume I - Text. Final, Revision O. June 1, 1995 *(results of systematic sampling in southern area of site, gives general overview of soils not thought to be contaminated),*

- OU-9 Regional Soils Investigation Report, Revision 2. August 1, 1995 *(purpose was to give a regional soil description away from impacts of Mound operations),*

- OU-3 Miscellaneous Sites Limited Field Investigation Report, Volumes 1, 2, and 3. Final, Revision O. July 1, 1993 *(purpose was to address areas noted in previous surveys; but, not thought to endanger human health or environment),*

- OU-9 Site Scoping Report, Volume. 3 - Radiological Site Survey, Final, June 1, 1993 *(a compendium of existing data),* and

- Soil Gas Confirmation Sampling. Revision 0. April 1, 1996 *(results of a study following up on a prior qualitative study).*

In the Mound 2000 process, radionuclide and chemical contaminants were studied on a PRS basis. There is one PRS within RB H, PRS 93. PRS 93 was identified as a PRS because it is the site of Seep 0603 and other seeps showed elevated concentrations of tritium. Tritium was detected at PRS 93 at low concentrations, i.e., in the range of 1000-3000 pCi/L.

Soil was sampled at PRS 93. All radionuclide and other contaminant concentrations were in the range of background.

A summary of the contaminants detected in RB H soils is shown in Table 2-5.

## 2.6 Potential Future Uses for Mound

The Mound Plant will remain in industrial use into the future. This future use has been determined based upon agreement among DOE, US EPA, OEPA, and interested stakeholders. This land use is reflected in the Mound Comprehensive Reuse Plan of the Miamisburg Mound Community Improvement Corporation (MMCIC) and is currently codified in the City of Miamisburg Zoning Ordinance for industrial use.

## 2.7 Summary of Site Risks

The human health risks for RB H were evaluated using the Residual Risk Evaluation Methodology (RREM) document developed for Mound. A residual risk evaluation (RRE) is a five-step process:

(1) identification of contaminants,

(2) exposure assessment,

(3) toxicity assessment,

(4) risk characterization, and

(5) evaluation of potential cumulative risks.

## Table 2-5. Soil Contaminants of Concern for RB H

| Soil Constituent | Maximum concentration Any Depth | Maximum concentration Shallow (<2' deep) | Screening Concentration (either Bkgd or G.V.)[1] |
|---|---|---|---|
| **ORGANICS (mg/kg)** | | | |
| Acenaphtene | 0.18 | 0.18 | |
| Acenaphthylene | 0.7 | 0.7 | |
| Aldrin | 0.0031 | 0.0031 | |
| Benzo(a)pyrene | 1.115 | 1.115 | 0.41[2] |
| Benzo(g,h,i)perylene | 1.0625 | 1.0625 | |
| delta-BHC | 0.00025 | 0.00025 | |
| Carbazole | 0.5875 | 0.5875 | |
| alpha Chlordane | 0.01 | 0.01 | |
| gamma Chlordane | 0.0074 | 0.0074 | |
| 4-chloro-3-methyl phenol | 0.047 | 0.047 | |
| Dibenzo(a,h)anthracene | 0.78 | 0.78 | 0.41[2] |
| Dibenzofuran | 1.035 | 1.035 | |
| Fluorene | 1.45 | 1.45 | |
| Heptachlor epoxide | 0.0022 | 0.0022 | |
| 2-Methylnaphthalene | 0.92 | 0.92 | |
| Naphthalene | 2.625 | 2.625 | |
| Phenanthrene | 3.75 | 3.75 | |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 0.002 | 0.002 | |
| INORGANICS (mg/kg) | | | |
| Arsenic (total) | 10.9 | 10.9 | 8.6[3] |
| Bismuth | 58.6 | 58.6 | |
| Copper (total) | 26.4 | 22.1 | 26[3] |
| Lead (total) | 163 | 163 | 48[3] |
| Lithium | 40.2 | 19 | 26[3] |
| RADIONUCLIDES (pCi/g) | | | |
| Cesium-137 | 1.9 | 1.9 | 0.42[4] |
| Plutonium-238 | 56 | 56 | 0.13[3] |
| Plutonium-242 | 0.0143 | 0.0143 | |
| Potassium-40 | 45.4 | 21 | 37[3] |
| Radium-226 | 3.15 | 3.15 | 0.13[4] |

Note: Blanks indicate background or Guideline Value not available. The more restrictive GV was used to determine which contaminants were carried through the RRE.

[1] Guideline values (GVs) are decision-making tools for the Core Team. GVs help the Core Team determine if contaminants are present at levels that warrant evaluation.

[2] GV corresponds to a total risk of $10^{-6}$ for the ingestion pathway.

[3] Background Value. When adequate numbers of measurements are available, background values are based on the 95% upper tolerance limit.

[4] GV corresponds to a total risk $10^{-6}$ for the ingestion, inhalation and external pathways.

Reference: "Technical Position Report in Support of the Release Block H Residual Risk Evaluation", Public Review Draft Rev 2, April, 1999.

### 2.7.1 Identification of Contaminants

The contaminants of concern (COCs) for RB H were identified by reviewing all of the sampling data for the release block. Based on that review, contaminants were eliminated for further evaluation based on criteria established in the RREM. Specifically, only contaminants exceeding (1) background, (2) a base level of potential health concern, and (3) certain frequency of detection (FOD) criteria were carried through the RRE. The COCs established for RB H are listed in Tables 2-3, 2-4, and. 2-5.

### 2.7.2 Exposure Assessment

The Site Conceptual Model (SCM) for Mound provides the basis for evaluating human exposure scenarios. Because DOE and its regulators and stakeholders agree that the future use of Release Block H will be industrial in nature, two receptor scenarios from the Mound SCM apply: a construction worker and a site employee. The routes of exposure applicable to these two receptors are shown in Figure 2-4. The significant pathways for RB H include ingestion of soil and groundwater.

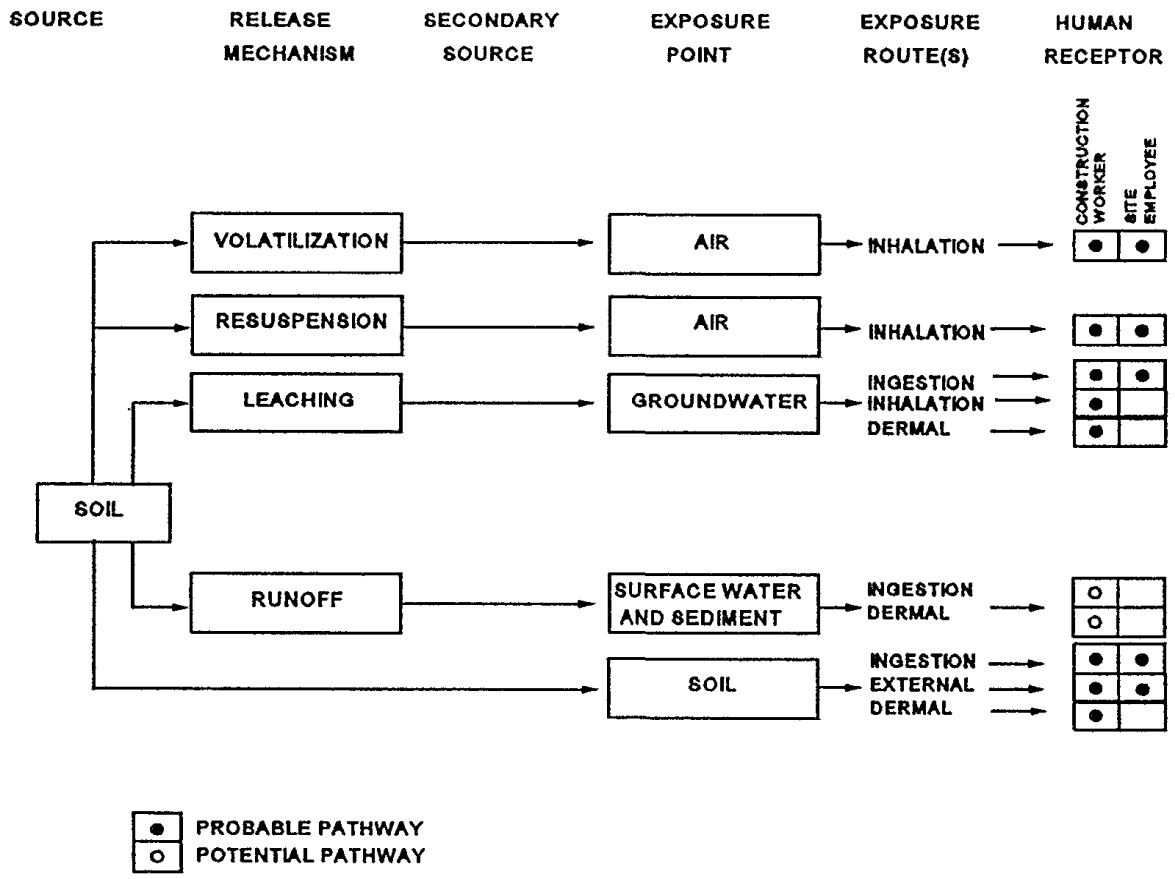
Using equations developed to support the SCM, exposures to specific concentrations of COCs are evaluated based on assuming intake rates for soil and groundwater. Once the intakes are estimated, the human health implications of those intakes are evaluated by reviewing toxicological data for the COCs.

For the special case of groundwater, the possible exposures to current and future COCs are evaluated. This approach ensures that the cumulative and long-term impacts of the COCs are adequately characterized.

### 2.7.3 Toxicity Assessment

The toxicological properties of each COC for RB H were evaluated by reviewing the Integrated Risk Information System (IRIS) and/or Health Effects Assessment Summary Table (HEAST) data for the COC. IRIS files provide no-observable effect levels and slope factors (for translating intake into cancer risk) for many of the chemicals encountered at Mound. HEAST provides slope factors for many of the radionuclides encountered at Mound. Based on the information collected from IRIS and HEAST, an adequate understanding of the toxicology of the RB H COCs has been developed.

## Figure 2-4. Exposure Pathways for the Mound Site Conceptual Model



### 2.7.4 Risk Characterization

Pursuant to the RREM, risks are quantified for both carcinogenic and non-carcinogenic contaminants. The risk associated with the intake of a known or suspected carcinogen is reported in terms of the incremental lifetime cancer risk presented by that COC, as estimated using the appropriate slope factor and the amount of material ingested. Potential human health hazards from exposure to non-carcinogenic contaminants are evaluated by using a Hazard Quotient (HQ). The HQ is determined by the ratio of the intake of a COC to a reference dose or concentration for the COC that is believed to represent a no-observable effect level. The COC-specific HQs are then summed to provide an overall Hazard Index (HI). US EPA guidance sets a limit of 1.0 for the Comprehensive HI.

The risks and hazards associated with residual concentrations of COCs in RB H are shown in Table 2-6. As shown in the table, the overall risk values are in the acceptable range of $10^{-4}$ to $10^{-6}$. The HIs for the future groundwater scenarios, however, are near or above the 1.0-limit. This is based on the bedrock groundwater contaminants flowing directly to the BVA that supplies drinking water for the plant. As a result, the selected remedy prohibits the use of bedrock groundwater. This institutional control, in the form of a deed restriction, will ensure that the residual risks associated with RB H remain acceptable.

Because the scope of the RRE was limited to industrial use, the soils within RB H have not been evaluated for unrestricted release (e.g., residential use). Disposition of RB H soils without proper handling, sampling and management could create an unacceptable risk to human health and the environment.

### 2.7.5 Evaluation of Potential Cumulative Risks

For purposes of the RREM, risks resulting from contaminants that originate outside the release block under consideration are called cumulative risks. In general, cumulative risks are possible via air, surface water, and ground water. For Mound, cumulative risks from surface waters are not expected because, other than storm water drainage, there are no surface water bodies flowing through RB H from other release blocks. Groundwater and air are therefore the media of concern for cumulative risks.

**Current groundwater.** The Mound RREM accounts for cumulative groundwater risks by evaluating current and future groundwater contamination. Since all groundwater currently used at Mound is drawn from the production wells located onsite, the risk

posed by current groundwater contamination is equal to the risk resulting from exposure to contaminants found in the production wells. This risk is identical for all release blocks and represents the cumulative risk from contaminants that migrate to the production wells from all release blocks.

**Future groundwater.** The future risk from groundwater was estimated for RB H based on the assumption that contaminants found in bedrock will eventually migrate to the Mound Plant production well located in the BVA. A simple and extremely conservative flow model was used to estimate the concentrations as a function of time. These concentration estimates were reported in Table 2-4.

**Air.** The Mound RREM accounts for cumulative residual risk via the air pathway by using data collected in 1994 from the Mound Plant perimeter air sampling stations to bound the concentrations and therefore the risks from inhalation of radionuclides present in ambient air. These values are reported in the "Technical Position Report in Support of the Release Block H Residual Risk Evaluation" and are included in Table 2-6.

The HI and risk values presented in Table 2-6 for the current groundwater, future groundwater, and air scenarios are therefore believed to adequately bound the potential cumulative risk for RB H. The potential cumulative risk can be added to the risks from exposures to contaminants within the release block to provide a measure of overall risk. The risk values presented in Table 2-6 labeled "Sum of Soil, Air and Groundwater" are therefore believed to adequately bound the potential overall risk.

### 2.7.6 Ecological Risk Assessment

Based on the results of an ecological characterization of the Mound Plant (OU-9 Ecological Characterization, March, 1994) there are no endangered species or critical habitats of endangered species on RB H. In addition, RB H is composed entirely of a parking lot, roads, and mowed lawns. There are no wetlands or surface waters located in RB H and no sensitive habitats. Therefore, DOE has determined, with concurrence from US EPA and OEPA, that an ecological assessment for RB H is not necessary.

## 2.8 Remediation Objectives

The primary remediation objective for RB H is to ensure the residual risk associated with the release block is acceptable for the defined use scenario of industrial occupants.

## Table 2-6. Current and Future Residual Risks for Release Block H

| | Construction Worker | | | | | |
|---|---|---|---|---|---|---|
| | **Soil** | **Air** | **Groundwater Current** | **Groundwater Future** | **Sum of Soil, Air and Groundwater Current** | **Sum of Soil, Air and Groundwater Future** |
| Non-carcinogenic Hazard Index for Organics & Inorganics | 4.0E-02 | N/A | 3.7E-02 | 1.6E+00 | HI = 7.7E-02 | HI = 1.7E+00 |
| Carcinogenic Risks for Organics & Inorganics | 4.7E-06 | N/A | N/A | N/A | Risk = 4.7E-06 | Risk = 4.7E-06 |
| Carcinogenic Risks for Radionuclides | 1.7E-05 | 2.0E-07 | 2.5E-06 | 2.9E-06 | Risk = 2.0E-05 | Risk = 2.3E-05 |
| | | | Construction Worker | | | |
| | | | Overall HI = | | 7.7E-02 | 1.7 E + 00 |
| | | | Overall Risk = | | 2.5E-05 | 2.8E-05 |

| | Site Employee | | | | | |
|---|---|---|---|---|---|---|
| | **Soil** | **Air** | **Groundwater Current** | **Groundwater Future** | **Sum of Soil, Air and Groundwater Current** | **Sum of Soil, Air and Groundwater Future** |
| Non-carcinogenic Hazard Index for Organics & Inorganics | 4.0E-03 | N/A | 3.7E-02 | 1.6E+00 | HI = 4.1 E-02 | HI = 1.6E+00 |
| Carcinogenic Risks for Organics & Inorganics | 2.0E-06 | N/A | N/A | N/A | Risk = 2.0E-06 | Risk = 2.0E-06 |
| Carcinogenic Risks for Radionuclides | 1.8E-05 | 9.9E-07 | 1.3E-05 | 1.4E-05 | Risk = 3.2E-05 | Risk = 4.6E-05 |
| | | | Site Employee | | | |
| | | | Overall HI = | | 4.1 E-02 | 1.6E+00 |
| | | | Overall Risk = | | 3.4E-05 | 4.8E-05 |

## 2.9 Description of Alternatives

As documented in Section 2.7, the risk from both carcinogens and non-carcinogens from RB H is within the acceptable range for the current industrial use. In light of the planned exit of DOE from the site, and the residual levels of contaminants in the soil and groundwater in RB H, a remedy must be implemented to protect human heath and the environment into the future. Two alternatives were considered for RB H; they are described below.

### 2.9.1 No Action

Regulations governing the Superfund program require that the "no action" alternative be evaluated at each site to establish a baseline for comparison. Under this alternative, DOE would take no action to prevent exposure to soil and groundwater contamination associated with RB H.

### 2.9.2 Institutional Controls

In this alternative, institutional controls in the form of deed restrictions on future land use would be placed on RB H. The objective of these institutional controls would be to prevent an unacceptable risk to human health and the environment by restricting the use of RB H, including RB H soils, to that which is consistent with assumptions in the RB H RRE. DOE or its successors would retain the right and responsibility to monitor, maintain, and enforce these institutional controls. In order to maintain protection for human health and the environment at RB H in the future, the institutional controls to be adopted would:

< Ensure that industrial land use is maintained;
< Prohibit the use of bedrock ground water;
< Provide site access for federal and state agencies for the purpose of taking response actions, including sampling and monitoring; and
< Prohibit removal of RB H soils from the DOE Mound property (as owned in 1998) boundary without approval from ODH and OEPA , or their successor agencies.

## 2.10 Selected Remedy

### 2.10.1 Description

The selected remedy for RB H is institutional controls in the form of deed restrictions on future land use. The specific restrictions to be adopted are provided in the deed attached to this ROD as Appendix A. The objective of these restrictions is to:

< Ensure that industrial land use is maintained;
< Prohibit the use of bedrock ground water;
< Provide site access for federal and state agencies for the purpose of taking response actions including sampling and monitoring; and
< Prohibit removal of RB H soils from the DOE Mound property (as owned in 1998) boundary without approval from ODH and OEPA , or their successor agencies.

DOE or its successors, as the lead agency for this ROD, has the responsibility to monitor, maintain and enforce these institutional controls. This responsibility includes the duty to conduct annual assessments of compliance with the deed restrictions and the duty to enforce the deed restrictions if any non-compliance is detected. The assessment and enforcement processes are outlined in Appendix C, which is intended to serve as a framework for implementation of operation and maintenance activities for the selected remedy. Within ninety (90) days of the date on which this ROD is signed, DOE shall submit to US EPA and Ohio EPA for their approval a formal proposal regarding operation and maintenance of the institutional controls. This proposal and the annual compliance assessments shall be considered primary documents under the Federal Facility Agreement. If DOE, US EPA and OEPA agree, the frequency of the compliance assessments can be changed at any time.

The soils within RB H have not been evaluated for any use other than on-site industrial use. Any off-site disposition of the RB H soil without proper handling, sampling, and management could create an unacceptable risk to off-site receptors. An objective of the preferred alternative is to prevent residual exposure to soils from RB H.

A copy of the deed is attached in Appendix A; this represents the remedy for RB H. DOE will develop an Operation and Maintenance Plan for the remedy. US EPA and OEPA have approval authority for this plan.

### 2.10.2 Estimated Costs

The initial costs associated with these deed restrictions are those associated with the writing and recording of the restrictions with the deed. The costs associated with monitoring and enforcing the land use and property deed restrictions are estimated to be $5,000 per year.

### 2.10.3 Decisive Factors

The US EPA has developed threshold, balancing and modifying criteria to aid in the selection of the remedy. There are two (2) threshold criteria, five (5) balancing criteria and two (2) modifying criteria. Each is described below.

**2.10.3.1 THRESHOLD CRITERIA** - *Must be met for an alternative to be eligible for selection:*

**(1) Overall protection of human health and the environment**

This criterion addresses whether an alternative provides adequate protection of human health and the environment. The "no action" alternative does not meet this criterion in that the level of risk to human health posed by the site was found to be acceptable only for an industrial scenario. No evaluation was made of the risks posed by unrestricted use of the property. Deed restrictions are required as a mechanism to ensure the continued future use of RB H is limited to industrial purposes.

**(2) Compliance with applicable or relevant and appropriate requirements**

Section 121 (d) of CERCLA requires that remedial actions at CERCLA sites attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA Section 121 (d)(4).

Applicable Requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address hazardous substances, the remedial action to be implemented at the site, the location of the site, or other circumstances present at the site. Relevant and Appropriate

Requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law which, while not applicable to the hazardous materials found at the site, the remedial action itself, the site location, or other circumstances at the site, nevertheless address problems or situations sufficiently similar to those encountered at the site that their use is well-suited to the site.

Compliance with ARARs addresses whether a remedy will meet all the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides the basis for invoking a waiver.

ARARs are of several types: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. For RB H, "Maximum Contaminant Levels" or “MCLs" established under the Safe Drinking Water Act constitute chemical-specific ARARs and are listed in Appendix D. They apply to the bedrock ground water beneath RB H. No evidence of any contamination above MCLs has been found in this ground water. Consequently, ARARs with respect to ground water are deemed to have been met.

Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are located in specific locations, e.g., flood plains, wetlands, historic places, etc. For RB H, Ohio has identified two statutory provisions that describe site conditions that would prompt certain response actions. (See Appendix D). These provisions are similar to location-specific ARARs. The selected remedy meets both of these requirements.

Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes. These requirements are triggered by the particular remedial activities that are selected to accomplish a remedy. In this case, the remedy is an institutional control - deed restrictions. The ARARs are applicable State requirements concerning the recording of deeds. (See Appendix D). The selected remedy will comply with these requirements.

It should be noted that any onsite management of RB H soils, not associated

with a CERCLA response action, in a manner inconsistent with State law or any disposition of RB H soils away from the Mound Superfund Site would be subject to applicable Ohio regulations, which are independently enforceable from CERCLA.

**2.10.3.2 BALANCING CRITERIA** - *used to weigh major trade-offs among alternatives:*

**(1) Long-term effectiveness and permanence**

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk and the adequacy and reliability of controls. Only Alternative 2, Institutional Controls, provides some degree of long-term protectiveness. The implementation of institutional controls in the form of land use restrictions is necessary to ensure that future use remains compatible with the evaluated residual risk associated with RB H.

Because this remedy will result in hazardous substances remaining in the RB H above levels that allow for unlimited use and unrestricted exposure, an annual review and report will be submitted to OEPA, ODH, and US EPA (pursuant to CERCLA) determining whether or not the remedy is in effect and being complied with to ensure that it is adequately protective of human health and the environment.

DOE reserves the right to petition the US EPA, OEPA, and ODH for a modification to the frequency established for conducting the effectiveness reviews.

**(2) Reduction of toxicity, mobility or volume through treatment**

Reduction of toxicity, mobility or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of the remedy.

Since neither of the alternatives includes treatment, this criterion does not require further evaluation.

**(3) Short-term effectiveness**

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers and the community during construction and operation of the remedy until clean-up goals are achieved.

Alternative 1, No Action, would not provide short-term effectiveness because there is no assurance of protection of human health and the environment after the property is transferred. Alternative 2, Institutional Controls, provides this assurance.

**(4) Implementability**

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered. Since Alternative 1 involves no action, there is no time or cost required for implementation. Alternative 2, Institutional Controls, is expected to require approximately one month and minimal cost to implement.

**(5) Cost**

The range of costs is zero dollars ($0) for Alternative 1, No Action, to approximately $5,000 annually for the maintenance of the deed restrictions for Alternative 2, Institutional Controls.

**2.10.3.3 MODIFYING CRITERIA** - *to be considered after public comment is received on the Proposed Plan and of equal importance to the balancing criteria:*

**(1) State/Support Agency Acceptance**

Both US EPA and the State do not believe that Alternative 1, No Action, provides adequate protection of human health and the environment in the future. However, both agencies support the selected remedy, Alternative 2, Institutional Controls.

### (2) Community Acceptance

Based on input received during the public comment period and the public hearing, the community accepts and supports the selected remedy.

## 2.11 Statutory Determinations

The selected remedy for RB H is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appeopriate (ARAR), is cost-effective, and utilizes a permanent solution to the maximum extent practicable. Because this remedy will result in hazardous substances remaining in Release Block H above levels that allow for unlimited use and unrestricted exposure, DOE in consultation with US EPA, Ohio EPA and ODH will review the remedial action each year to assure that human health and the environment are being protected by the remedial action being implemented.

DOE reserves the right to petition the US EPA, OEPA, and ODH for a modification to the frequency established for conducting the effectiveness reviews.

## 2.12 Documentation of Significant Changes

Although this ROD has been signed, new information may be received or generated that could affect the implementation of the remedy. DOE, as the lead agency for this ROD, has the responsibility to evaluate the significance of any such new information. The type of documentation required for a post-ROD change depends on the nature of the change. Three categories of changes are recognized by the US EPA: non-significant, significant, and fundamental. Non-significant post-ROD changes may be documented using a memo to the Administrative Record file. Changes that significantly affect the ROD must be evaluated pursuant to CERCLA Section 117 and the NCP at 40 CFR 300.435(c)(2)(I). Fundamental changes typically require a revised Proposed Plan and an amendment to the ROD. Significant or fundamental changes to the ROD for Release Block H are not anticipated.

# 3.0 RESPONSIVENESS SUMMARY

This section of the ROD presents stakeholder concerns about RB H and explains how those concerns were addressed prior to issuance of the ROD.

During the public meeting on the Proposed Plan, one stakeholder provided a formal comment. During the public review period for the Proposed Plan, other stakeholders

provided additional comments. The Core Team responded to stakeholders by letter. The comments and responses are also presented here.

- **Comments Received during the Public Meeting held on the Proposed Plan for Release Block H**

Comment:
My name is Jeff Fischer. I see that there's an update on risk factors from IRIS. That's a good thing. There are several chemicals as well as radionuclides that have updated factors. That brings up the question, what impact does this have on earlier work that's been done in terms of calculations? Has this been looked at for other release blocks?

Response:
The impact of revised risk factors from IRIS and HEAST on earlier work has been evaluated. Release Block D was the only release block affected because it was the only release block with a completed residual risk evaluation. The "Technical Position Report in Support of the Release Block D Residual Risk Evaluation" (January, 1999) documented the impact of revisions in risk factors that occurred after the Residual Risk Evaluation was complete (December, 1996).

- **Comments on the Technical Position Report in Support of the Release Block H Residual Risk Evaluation and the Proposed Plan for Release Block H**

Comment:
Add RfD) (Table 2-1) to the Acronym List.

Response:
RfD will be added to the Acronym List on the final TPR.

Comment:
Note that the daughter product of Thorium 232 is Radium 228, rather than Radium 226 (page 6 and page 8). Likewise, the eventual daughter product of Uranium 238 is Radium 226.

Response:
The original RRE incorrectly stated that radium-226 was the daughter of thorium-232. This was one of the drivers for using the TPR to document the risks from radium-226 and its daughters. Radium-226 risks are therefore accounted for in the risk values presented in the ROD. The final edition of the TPR has been reworded to clarify this point.

Comment:
It is my thinking that the risk factors (for radionuclides) from inhalation, ingestion, and external exposure should be totaled for a more accurate risk figure. Also, in the face of the additional risk from hazardous chemicals -- does each of the two categories not enhance the effect of the other?

Response:
The risk factors for radionuclides have been totaled for all pathways (see for example Tables 3-1a and 3-1b of the TPR). Overall cancer risks for radionuclides and chemicals have also been totaled (see for example Tables 6.1 and 6.2 of the Proposed Plan). The overall cancer risk and the overall hazard index (for chemicals that are not carcinogens), however, have not been totaled; there is no consensus method available for summing these different figures-of-merit which represent very different types of potential health effects. Similarly, there is no consensus method available for estimating the synergistic effects possibly associated with exposure to both radionuclides and chemicals.

Comment:
Genetic effects were not included in the risk calculations, as far as I could see. These may have been ruled out due to the two categories of persons considered in the calculations. However, should a genetic defect appear in any of their families, this is a painful experience should it happen within future generation.

Response:
The comment is correct in noting that genetic effects are not accounted for in the HEAST slope factors used to translate intake of, or external exposure to, radionuclides into risk. The slope factors account solely for the additional cancer risk potentially associated with ingestion, inhalation, or external exposure using a linear, non-threshold dose-response model. The IRIS slope factors used for chemical carcinogens are also subject to this limitation.

Comment:
The "Core Team" of representatives from DOE, US EPA, and OEPA evaluated the potential contamination problems and recommended “the appropriate response." My question is: were any citizens involved in determining that response? Would a meeting for those persons interested in reviewing the contamination problems and recommendations be feasible? A simple explanation of how the calculations were made would be helpful to me.

Response:
The Core Team welcomes the opportunity to meet with citizens and discuss the Mound 2000 process and its results. The community was an active participant in developing this process (Mound 2000) and helped determine points of direct involvement. The Residual Risk Evaluation Methodology and the Residual Risk Evaluation for Release Block H have gone through a public comment cycle and copies are in the CERCLA Public Reading Room. The process requires comments from the public on the PRS recommendations be responded to or incorporated as part of the remedy evaluation. DOE believes all comments have been resolved with the commenter and the documents, comments, and responses have been placed in the CERCLA Public Reading Room.

Comment:
Before considering the transfer of more parcels, I would like to know if any historical records or deeds were searched to determine whether or not some record exists which would encourage us to honor the Miami Indian culture in some way.

Response:
Archeological field surveys have been performed. In 1987, Wright State University conducted archeological survey of the acceptable portions of the South Property (RB A & B). Based on the results of the field work and a review of applicable literature, the survey team concluded that the South Property did not have the research potential to make it eligible for listing on the National Register of Historic Places. Subsequent correspondence from the Ohio Historic Preservation office reaffirmed that conclusion. A follow-up survey conducted in 1991 examined areas immediately adjacent to, but not including the South Property. Four historic sites were noted: a segment of the Miami-Erie Canal, a bridge remnant, a bridge, and a city well. None of these sites were judged to be eligible for the National Register of Historic Places.

Comment:
The estimate of $5000 as a fund to be used for the future monitoring of Parcel H seems to me to be an underestimation, since the cost of lab tests, etc., is substantial.

Response:
The referenced estimate of $5000 per year is the anticipated annual cost of maintaining deed restrictions and performing effectiveness reviews for USEPA and OEPA as described in the Proposed Plan. Any required future monitoring within this RB would be funded separately.

Comment:
The party which purchases Release Block H should commit, as well, when he/she transfers the site to another owner, to the transfer of all existing environmental reports provided by DOE. In addition, to the succeeding owners, all records should be filed with the City of Miamisburg Records of Deeds Office, the County Zoning Board, and the Ohio Records Offices and federal agencies so designated.

Response:
We share your concern for long term retention and dissemination of information about the site. The Federal Facility Agreement addresses document retention for at least 10 years after termination of the FFA. As the Mound project continues and approaches completion, we will revisit the issue of long term retention and dissemination of information to succeeding owners.

Comment:
We understand that a professional property survey has been completed for Release Block H. Will the complete legal description of Release Block H, with a thorough description of the property boundaries, be included in the Release Block H Record of Decision?

Response:
The complete legal description of Release Block H will be included in the Record of Decision as an Appendix.

Comment:
We wish to clarify the term "industrial use" or "industrial land use" as it appears in the Proposed Plan. The first sentence of Section 3.0, Exposure Assessment, of the Release Block H Residual Risk Evaluation (RRE) states that "[DOE], Ohio EPA, U.S. EPA, and the Mound Facility stakeholders have agreed that the future use of the Mound Plant property will be commercial/industrial use." The section then goes on to describe the two commercial/industrial exposure scenarios utilized in the RRE and defined in the Mound 2000 Residual Risk Evaluation Methodology as 1) a construction worker assumed to work on the property eight hours per day for 250 days per year over a five-year period, and 2) a site employee assumed to work for eight hours per day for 250 days per year over a 25-year period and who does not shower in water from a well on the property.

We assume, therefore, based on the foregoing scenarios, that the use of the term "industrial" in the Release Block H Proposed Plan refers to the risk exposure scenario evaluated for this property and is not restricted solely to the industrial land use category, but incorporates both commercial and industrial land uses. Are our assumptions correct?

Response:
Yes, your assumptions are correct. "Industrial" refers to the risk exposure scenario evaluated for the property. This incorporates both commercial and industrial land uses that are consistent with the restrictions placed on the deed and as described in the ROD.

Comment:
The fourth sentence of the second paragraph of Page 3 should read something line "Before transfer of a release block can be completed, all buildings and PRSs must be evaluated for protectiveness **to human health and the environment for Industrial reuse** or be remediated to be protective." The word protectiveness is not defined at a previous point in the text.

Response:
This language has been incorporated into the appropriate section (2.4 Scope and Role of RB H) of the Record of Decision.

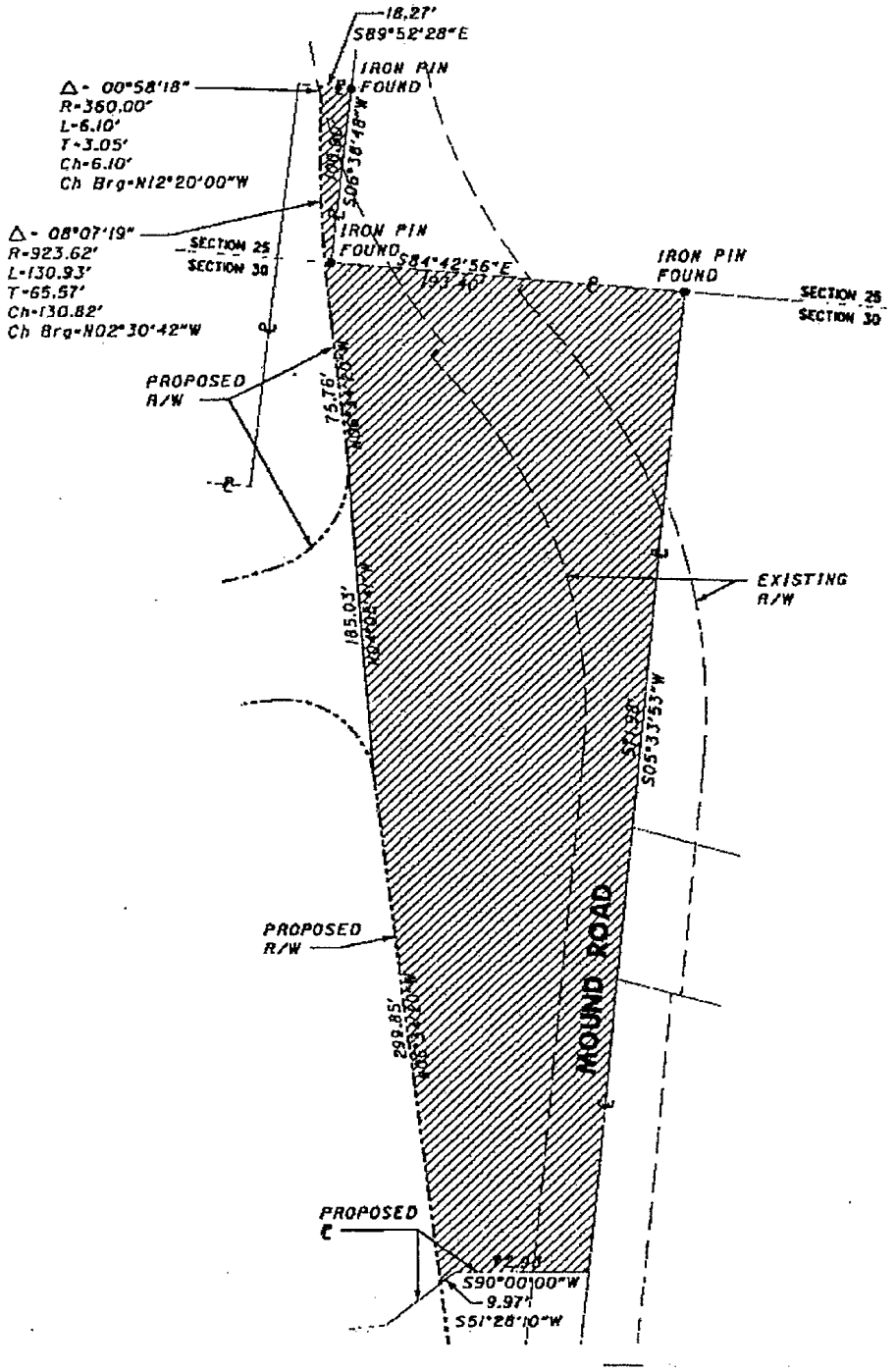
Comment:
A wedge of Release Block H property lies outside (east of) the Mound facility fence line along Mound Road, between the Mound entrance driveway and Mound Road itself, and one corner of property lies to the east of Mound Road. (Refer to Attachment A for a map of the wedge of Release Block H property and to Attachment B for a legal description.) MMCIC believes that the Miamisburg community would receive a benefit from an exclusion from the soil removal restriction for this wedge of property as described below.

Once MMCIC completes its proposed improvement along the section of Mound Road that includes this wedge of Block H property, MMCIC plans to dedicate the road to the City of Miamisburg. Any maintenance or improvements required for the road after that time will become the responsibility of the City. A soil removal restriction for this wedge of property along Mound Road will be extremely difficult to police once the road is dedicated to the City.

Historical information described in the Release Block H Proposed Plan confirms that no industrial, commercial, or research activities associated with the Mound facility operations ever took place on this portion of Release Block H.

In addition, MMCIC has reviewed the soil sample analytical data for the described wedge of property. The analytical data, which for the most part result from laboratory analyses for radionuclides, indicate concentrations that are either equal to the method detection limits (i.e., non-detects) or within the 10-5 Guideline Values for a residential scenario established for the respective compounds at the Mound facility. There are two exceptions to these observations: Cesium-137 detected at 0.6 pCi/g and Plutonium-238 detected 26 pCi/g.

MMCIC there requests that, if necessary, a focused residential residual risk evaluation be performed to support an exclusion from the soil removal restriction for the described wedge of property in Release Block H.


18.27'
S89°52'28"E
IRON PIN FOUND
Δ = 00°58'18"
R=360.00'
L=6.10'
T=3.05'
Ch=6.10'
Ch Brg=N12°20'00"W
S06°38'48"W
Δ = 08°07'19"
R=923.62'
L=130.93'
T=65.57'
Ch=130.82'
Ch Brg=N02°30'42"W
SECTION 25
SECTION 30
IRON PIN FOUND
S84°42'56"E
193.40'
IRON PIN FOUND
SECTION 25
SECTION 30
PROPOSED R/W
75.76'
N06°34'50"W
EXISTING R/W
185.03'
N06°40'41"W
S05°33'53"W
PROPOSED R/W
299.85'
N06°33'20"W
MOUND ROAD
PROPOSED
72.91'
S90°00'00"W
9.97'
S51°28'10"W

ATTACHMENT B
DESCRIPTION FOR SOIL EXCLUSION AREA
6.604 ACRES

Situate in the County of Montgomery, in the State of Ohio and in the City of Miamisburg, part of Section 25, Town 1, Range 6 MRs and part of Section 30, Town 2, Range 5 MRs and being more particularly described as follows: **Commencing** at an iron pin found on the southerly projection of the centerline of Mound Road, said point also being the northeast corner of a 164.13 Acre tract of land as described in Deed Book 1246, Page 45 of the Deed Records of Montgomery County and being the **TRUE POINT OF BEGINNING,**

thence South 06° 38' 48" West, 100.00 feet to an iron pin found; thence South 84° 42' 56" East, 193.40 feet to an iron pin found; thence South 05° 33' 53" West, 571.98 feet to a point on the centerline of Mound Road; thence due West, 72.93 feet to a point; thence South 51° 28' 10" West, 9.97 feet to a point on the proposed westerly right-of-way of Mound Road; thence along the proposed westerly right-of-way of Mound Road, North 06° 34' 20" West, 299.85 feet to a point; thence North 04° 05' 41" West, 185.03 feet to a point; thence along the proposed westerly right-of-way of Mound Road, North 06° 34' 20" West, 75.76 feet to a point; thence along the proposed westerly right-of-way of Mound Road, on a curve to the right for a distance of 130.93 feet with a radius of 923.62 feet and a central angle of 08° 07' 19" and a chord distance of 130.82 feet and a chord bearing of North 02° 30' 42" West to a point; thence along the existing westerly right-of-way of Mound Road, on a non-tangent curve to the right for a distance of 6.10 feet with a radius of 360.00 feet and a central angle of 00° 58' 18" and a chord distance of 6.10 feet and a chord bearing of North 12° 20' 00" West to a point; thence South 89° 52' 28" East, 18.27 feet to the **POINT OF BEGINNING.**

Containing 287,684.98 square feet, 6.604 acres more or less, and subject to all legal highways, easements, and agreements of record.

Response:
To respond to this comment, it was necessary to review the soil data for the referenced "wedge". Based on that review, two contaminants of concern (COCs) were identified. A risk analysis was then performed using those two COCs. The analysis bounded the risks from the uncontrolled release of the"wedge" soil by assuming the soils were relocated to a residential area. The risk results were used to determine if the deed restriction was required to protect human health and the environment. Results and conclusions are summarized below.

**Contaminants of concern.** The data review confirmed that the plutonium-238 value of 26 pCi/g was the highest Pu-238 result reported in and around the "wedge". It is important to note that the value was generated using soil screening instruments that have a plutonium-238 detection limit of about 25 pCi/g. Therefore, actual Pu-238 concentrations in the area, as documented by measurements made with more sensitive instruments, were much lower (# 3.9 pCi/g). However, in the interest of conservatism, the 26-pCi/g result was used to evaluate the residual risks potentially associated with exposure to Pu-238 in the soil. (Note that a 95% upper confidence level was not calculated as fewer than 20 Pu-238 results were available.)

The cesium-137 value of 0.6 pCi/g was also found to be an appropriate bounding concentration. The highest measured Cs-137 concentration was outside, but in proximity to, the boundaries of the wedge. For cesium, a 95% upper confidence level was not calculated as fewer than 20 cesium-131 results were available.

All other radionuclide results were at or below their respective background levels. Specifically, isotopes of radium, thorium, and uranium were detected, but in concentrations that did not warrant inclusion in this analysis.

**Risk analysis.** The analysis assumed an individual would incidentally consume and ingest soils from the wedge. The same individual was assumed to receive external exposure from the soil and to ingest additional radioactivity via transfer of the contaminants from the soil to produce grown in a home garden. The results of the risk analysis are shown in the following two tables.

## Table 1. Release Block "H" Wedge Risk Analysis for Pu-238

**Risk Calculations for Pu-238 Soil Inhalation, Soil Ingestion, External Exposure, and Consumption of Produce from a Home Garden**
(Ref: Equation and parameter values from Risk-Based Guideline Values, March 1997)

**Maximum Pu-238 Soil Concentration**
26 pCi/g Concentration (Location SCR974 -- in the center of the RB H "wedge")

**Slope Factors**
2.95E-10 risk/pCi ingested
2.74E-08 risk/pCi inhaled
1.94E-11 risk/yr/pCi/g

**Risk: Residential Soil Ingestion** [redacted]

Risk = CS * EF * [(IRc*EDc)+(IRa*EDa)] * ING SF
CS = 26 pCi/g (CS = concentration in soil)
EF = 350 days/year (EF = exposure frequency)
IRc = 0.2 g/day (IRc = child ingestion rate)
EDc = 6 years (EDc = child exposure duration)
IRa = 0.1 g/day (IRa = adult ingestion rate)
EDa = 24 years (EDa = adult exposure duration)
ING SF = 2.95E-10 risk/pCi ingested

**Risk = 9.66E-06**

**Risk: Residential Soil Inhalation** [redacted]

Risk = CS * EF * ED * IR * (1/PEF) * INH SF * 1000 g/kg
CS = 26 pCi/g (CS = concentration in soil)
EF = 350 days/year (EF = exposure frequency)
ED = 30 years (ED = exposure duration)
IR = 20 m^3/day (IR = inhalation rate)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
INH SF = 2.74E-08 risk/pCi inhaled

**Risk = 3.50E-08**

**Risk: Residential External Exposure** [redacted]

Risk = CS * ED * (1-SE) * TE *EXT SF
CS = 26 pCi/g
ED = 30 yr (ED = exposure duration)
SE = 0.2 unitless (SE = gamma shielding factor)
TE = 0.375 unitless (TE = gamma exposure time factor)
EXT SF = 1.94E-11 risk/yr/pCi/g (EXT SF = external slope factor)

**Risk = 4.54E-09**

**Risk: Residential Home Garden** [redacted]

Risk = CS * BV * IR * FI * EF * ED * ING SF
CS = 26 pCi/g (CS = concentration in soil)
BV = 5.0E-04 unitless (BV = soil-to-plant concentration factor for plutonium)
IR = 340 g/day (IR = produce ingestion rate)
FI = 0.36 unitless (FI = fraction of produce from home garden)
EF = 350 days/year (EF = exposure frequency)

ED = 30 years (ED = exposure duration)
ING SF = 2.95E-10 risk/pCi ingested (ING SF = ingestion slope factor)

**Risk = 4.93E-06**

**Pu-238 Risk Summary for Residential Use of RB H Wedge Soil**

| | Risk |
|---|---|
| Soil ingestion | 9.66E-06 |
| Soil inhalation | 3.50E-08 |
| External exposure | 4.54E-09 |
| Home-grown produce | 4.93E-06 |
| **Total** | **1.46E-05** |

## Table 2. Release Block "H" Wedge Risk Analysis for Cs-137

**Risk Calculations for Cs-137+D Soil Inhalation, Soil Ingestion, External Exposure, and Consumption of Produce from a Home Garden**

(Ref: Equation and parameter values from Risk-Based Guideline Values, March 1997)

**Cs-137 Soil Concentration**

| | |
|---|---|
| 0.6 pCi/g | Maximum concentration (Location S0219 -- just outside the RB H "wedge") |
| 1.02 pCi/g | Total concentration (including background value of 0.42 pCi/g) |

**Slope Factors**

3.16E-11 risk/pCi ingested
1.91E-11 risk/pCi inhaled
2.09E-06 risk/yr/pCi/g

**Risk: Residential Soil Ingestion** [redacted]

Risk = CS * EF * [(IRc*EDc)+(IRa*EDa)] * ING SF

| | | |
|---|---|---|
| CS = | 1.02 | pCi/g (CS = concentration in soil) |
| EF = | 350 | days/year (EF = exposure frequency) |
| IRc = | 0.2 | g/day (IRc = child ingestion rate) |
| EDc = | 6 | years (EDc = child exposure duration) |
| IRa = | 0.1 | g/day (IRa = adult ingestion rate) |
| EDa = | 24 | years (EDa = adult exposure duration) |
| ING SF = | 3.16E-11 | risk/pCi ingested |

**Risk = 4.06E-08**

**Risk: Residential Soil Inhalation** [redacted]

Risk = CS * EF * ED * IR * (1/PEF) * INH SF * 1000 g/kg

| | | |
|---|---|---|
| CS = | 1.02 | pCi/g (CS = concentration in soil) |
| EF = | 350 | days/year (EF = exposure frequency) |
| ED = | 30 | years (ED = exposure duration) |
| IR = | 20 | m^3/day (IR = inhalation rate) |
| PEF = | 4.28E+09 | m^3/kg (PEF = particulate emission factor) |
| INH SF = | 1.91E-11 | risk/pCi inhaled |

**Risk = 9.56E-13**

**Risk: Residential External Exposure** [redacted]

Risk = CS * ED * (1-SE) * TE *EXT SF

| | | |
|---|---|---|
| CS = | 1.02 | pCi/g |
| ED = | 30 | yr (ED = exposure duration) |
| SE = | 0.2 | unitless (SE = gamma shielding factor) |
| TE = | 0.375 | unitless (TE = gamma exposure time factor) |
| EXT SF = | 2.09E-06 | risk/yr/pCi/g (EXT SF = external slope factor) |

**Risk = 1.92E-05**

**Risk: Residential Home Garden**

Risk = CS * BV * IR * FI * EF * ED * ING SF

| | | |
|---|---|---|
| CS = | 1.02 | pCi/g (CS = concentration in soil) |
| BV = | 4.0E-02 | unitless (BV = soil-to-plant concentration factor for cesium) |
| IR = | 340 | g/day (IR = produce ingestion rate) |
| FI = | 0.36 | unitless (FI = fraction of produce from home garden) |
| EF = | 350 | days/year (EF = exposure frequency) |
| ED = | 30 | years (ED = exposure duration) |
| ING SF = | 3.16E-11 | risk/pCi ingested (ING SF = ingestion slope factor) |

**Risk = 1.66E-06**

**Cs-137 Risk Summary for Residential Use of RB H Wedge Soil**

| | Risk |
|---|---|
| Soil ingestion | 4.06E-08 |
| Soil inhalation | 9.56E-13 |
| External exposure | 1.92E-05 |
| Home-grown produce | 1.66E-06 |
| **Total** | **2.09E-05** |

**Results and conclusions.** Based on the conservative exposure scenarios detailed above, the absence of a restriction on the movement of RB H "wedge" soils would not present an unacceptable risk to a member of the public. In addition, the RB H "wedge" was not used as a process area, is located outside the controlled (security fence) area, has had no reported releases, and has no anomalous locations identified by qualitative field instrumentation. Therefore, the DOE and the US and Ohio EPAs concur with the request from MMCIC to lift the restriction and the appropriate notations appear elsewhere in this ROD, however, OEPA and ODH recommend that any surplus soils from this area be uses or kept on the Mound property to eliminate any future concerns regarding disposition of soil.

## 4.0 ADMINISTRATIVE RECORD FILE REFERENCES

Information used to select the remedy is contained in the Administrative Record file. The file is available for review at the Mound CERCLA Reading Room, Miamisburg Senior Adult Center, 305 Central Avenue, Miamisburg, Ohio. The Administrative Record File references for RB H includes the following:

An Archaeological Survey of Portions ot the Mound Facility, Montgomery County, Ohio, Public Archaeology Report No. 18, Laboratory of Anthropology, Wright State University, December, 1987.

Literature Review Update and Archaeological Survey of the EG&G Mound Facility and Adjacent Areas, City of Miamisburg, Miami Township, Montgomery County, Ohio, April 16, 1991.

Remedial Investigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan, Final, May 1992.

Operable Unit 9 Site Scoping Report, Volume 3 - Radiological Site Survey, Final, June 1, 1993.

Operable Unit 9; Hydrogeologic Investigation: Bedrock Report, Technical Memorandum, Revision 0, January 1994.

Operable Unit 9; Ecological Characterization; Technical Memorandum, Revision 0, March 1994.

Operable Unit 9; Hydrogeologic Investigation: Buried Valley Aquifer Report, Technical Memorandum, Revision 1, September 1994.

Operable Unit 9 Background Soils Investigation Soil Chemistry Report, Technical Memorandum, Revision 2, September 1994.

Operable Unit 9 Hydrogeologic Investigation: Groundwater Sweeps Report, Technical Memorandum, April, 1995.

Other Soils Characterization Report, Volume I - Text. Final, Revision 0. May 1,1995.

Operable Unit 9 Regional Soils Investigation Report, Revision 2, August 1, 1995,

Potential Release Site Package, PRS #93, Final, Revision 2, November 1996.

Residual Risk Evaluation, Release Block H, August 1997.

The Mound 2000 Residual Risk Evaluation Methodology (RREM), Mound Plant, Final, Revision 0, January 6, 1997.

Workplan for Environmental Restoration at the Mound Plant, The Mound 2000 Approach, December 1998.

Memorandum, Randolph Tormey, Deputy Chief Counsel, Ohio Field Office, US DOE dated February 17, 1999 regarding Institutional Controls, Mound Facility, Miamisburg, Ohio.

Letter from Mr. Timothy J. Fischer, Remedial Project Manager, US EPA to Mr. Arthur Kleinra, US DOE dated April, 1999, RE: Ecological Risk Assessment, Release Block H.

Letter from Mr. Brian Nickel, Mound Project Manager, Office of Federal Facilities and Oversight, OEPA to Mr. Oba Vincent, US DOE dated April, 1999, RE: DOE Mound Release Block H Ecological Assessment.

Technical Position Report In Support of the Release Block H Residual Risk Evaluation, Public Review Draft, Rev 2, April 1999.

Appendix A

Quitclaim Deed for RB H

# QUITCLAIM DEED

The UNITED STATES OF AMERICA, acting by and through the Secretary of the Department of Energy (hereinafter sometimes called "Grantor"), under and pursuant to the authority of the Atomic Energy Act of 1954, Section 161 (g) (42 U.S.C. §2201(g), the covenants contained herein, and other good and valuable consideration, duly paid by the Miamisburg Mound Community Improvement Corporation, a non-profit corporation subsisting under the laws of Ohio and recognized by the Secretary of Energy as the agent for the community wherein the former Mound Facility is located (hereinafter sometimes called "Grantee"), the receipt of which is hereby acknowledged, hereby QUITCLAIMS unto Grantee its successors and assigns, subject to the reservations, covenants, and conditions hereinafter set forth, all of its right, title and interest, together with all improvements thereon and appurtenances thereto, in the following described premises, commonly known as Parcel H:

Situate in the State of Ohio, County of Montgomery, being in the City of Miamisburg, being part of Section 30, Range 5, Township 2, lying in the Miami Rivers Survey (M.R.S.), and being part of city lots numbered 2259 within the Corporation Limits of the City of Miamisburg, and being more particularly bounded and described with bearings referenced to the Ohio State Coordinate System, South Zone, as follows:

Beginning at a concrete monument, being the North East comer of Section 36 and the North West corner of Section 30, and being the point of beginning for the land herein described, thence S 5E 47' 45" W 130.89 feet to an iron pin being the TRUE POINT OF BEGINNING; thence S 85E 03' 12" E 1023.90 feet to a concrete monument, thence N 6E 54' 59" E 231.00 feet to a concrete monument, thence S 84E 36' 50" E 30.00 feet to a iron pin, thence S 6E 54' 54" W 100.00 feet to a iron pin, thence S 84E 36' 37" E 193.40 feet to a concrete monument, thence S 5E 34' 19" W 571.986 feet along the center line of Mound Road to a point, thence S 90E 0' 0" W 72.86 feet to a point, thence S 51E 28' 1.6" W 48.51 feet to a point, thence S 83E 32' 4" W 97.29 feet to a point, thence S 63E 48' 53" W 98.67 feet to a point, thence N 89E 55' 58" W 173.02 feet to a point, thence N 83E 49' 39" W 244.21 feet to a point, thence along the arc of a curve to the right having a radius of 360.67 feet for a distance of 353.12 feet to a point, thence N 25E 03' 02" W 214.48 feet to a point, thence S 64E 03' 10" W 37.94 feet to a point, thence N 64E 35' 31" W 56.61 feet to a point, thence N 25E 43' 03" W 160.76 feet to a point, thence N 65E 33' 00" E 35.05 feet to a point, thence N 5E 31' 01" E 57.67 feet to a iron pin being the true point of beginning containing 14.29 acres more or less, and subject to all legal highways and easements of record. Prior Deed Reference: Deed Book____, Page ____.

RESERVING UNTO Grantor, the United States Environmental Protection Agency (USEPA) and the State of Ohio, acting by and through the Director of the Ohio Environmental Protection Agency (OEPA) or the Ohio Department of Health (ODH), their successors and assigns, an easement to, upon or across the Premises in conjunction with the covenants of

Grantor and/or Grantee in paragraphs numbered 1.1-1.3, 3.2 and 3.3 of this Deed and as otherwise needed for purposes of any response action as defined under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended, including but not limited to, environmental investigation or remedial action on the Premises or on property in the vicinity thereof, including the right of access to, and use of, to the extent permitted by applicable law, utilities at reasonable cost to Grantor. Grantee understands that any such response action will be conducted in a manner so as to attempt to minimize interfering with the ordinary and reasonable use of the Premises.

This Deed and conveyance is made and accepted without warranty of any kind, either express or implied, except for the warranty in paragraph 3.3 of this Deed, and is expressly made under and subject to all reservations, restrictions, rights, covenants, easements, licenses, and permits, whether or not of public record, to the extent that the same affect the Premises.

1 . The parties hereto intend the following restrictions and covenants to run with the land and to be binding upon the Grantee and its successors, transferees, and assigns or any other person acquiring an interest in the Premises, for the benefit of Grantor, USEPA and the State of Ohio, acting by and through the Director of OEPA or ODH, their successors and assigns.

1.1 Excepting those soils **Commencing** at an iron pin found on the southerly projection of the centerline of Mound Road, said point also being the northeast corner of a 164.13 Acre tract of land as described in Deed Book 1246, Page 45 of the Deed Records of Montgomery County and being the **TRUE POINT OF BEGINNING**, thence South 06E 38' 48" West, 100.00 feet to an iron pin found; thence South 84E 42' 56" East, 193.40 feet to an iron pin found; thence South 05E 33' 53 " West, 571.98 feet to a point on the centerline of Mound Road; thence due West, 72.93 feet to a point; thence South 51E 28' 10" West, 9.97 feet to a point on the proposed westerly right-of-way of Mound Road; thence along the proposed westerly right-of-way of Mound Road, North 06E 34' 20" West, 299.85 feet to a point; thence North 04E 05' 41" West, 185.03 feet to a point; thence along the proposed westerly right-of-way of Mound Road, North 06E 34' 20" West, 75.76 feet to a point; thence along the proposed westerly right-of-way of Mound Road, on a curve to the right for a distance of 130.93 feet with a radius of 923.62 feet and a central angle of 08E 07' 19" and a chord distance of 130.82 feet and a chord bearing of North 02E 30' 42" West to a point; thence along the existing westerly right-of-way of Mound Road, on a non-tangent curve to the right for a distance of 6.10 feet with a radius of 360.00 feet and a central angle of 00E 58' 18" and a chord distance of 6.10 feet and a chord bearing of North 12E 20' 00" West to a point; thence South 89E 52' 28" East, 18.27 feet to the **POINT OF BEGINNING**.

Containing 287,684.98 square feet, 6.604 acres more or less, and subject to all legal highways, easements, and agreements of record. Grantee covenants that any soil from the Premises shall not be placed on any property outside the boundaries of that described in instruments recorded at Deed Book **(1214, pages 10, 12, 15, 17 and 248; Deed Book 1215, page 347; Deed Book 1246, page 45; Deed Book 1258, pages 56 and 74; Deed Book 1256, page 179; Micro-Fiche 81-376A01; and Micro-Fiche**

**81-323A11)** of the Deed Records of Montgomery County, Ohio (and as illustrated in the CERCLA 120(h) Summary, Notices of Hazardous Substances Release Block H, Mound Plant, Miamisburg, Ohio dated _____, 1999) without prior written approval from ODH and OEPA, or successor agencies.

1.2 Grantee covenants not to use, or allow the use of, the Premises for any residential or farming activities, or any other activities which could result in the chronic exposure of children under eighteen years of age to soil or groundwater from the Premises. Restricted uses shall include, but not be limited to:

(1) single or multifamily dwellings or rental units;
(2) day care facilities;
(3) schools or other educational facilities for children under eighteen years of age; and
(4) community centers, playgrounds, or other recreational or religious facilities for children under eighteen years of age.

Grantor shall be contacted to resolve any questions which may arise as to whether a particular activity would be considered a restricted use.

1.3 Grantee covenants not to extract, consume, expose, or use in any way the groundwater underlying the premises without the prior written approval of the United States Environmental Protection Agency (Region V) and the OEPA.

2. The Grantor hereby grants to the State of Ohio and reserves and retains for itself, its successors and assigns an irrevocable, permanent, and continuing right to enforce the covenants of this Quitclaim Deed through proceedings at law or in equity, including resort to an action for specific performance, as against and at the expense of Grantee, its successors and assigns, including reasonable legal fees, and to prevent a violation of, or recover damages from a breach of, these covenants, or both. Any delay or forbearance in enforcement of said restrictions and covenants shall not be deemed to be a waiver thereof.

3. Pursuant to Section 120(h)(3) of the Comprehensive Environmental Response, Compensation and Liability Act of 1930, as amended (42 U.S.C. §9620(h)(3)), the following is notice of hazardous substances, the description of any remedial action taken, and a covenant concerning the Premises.

3.1 **Notice of Hazardous Substance**: Grantor has made a complete search of its files and records concerning the Premises. Those records indicate that the hazardous substances listed in Exhibit "B," attached hereto and made a part hereof, have been stored for one year or more or disposed of on the Premises and the dates that such storage/disposal took place.

3.2 **Description of Remedial Action Taken**:
Institutional Controls are established. The Institutional Controls are set forth as covenants in Sections 1.1, 1.2, and 1.3 of this Deed.

3.3 **Covenant**: Grantor covenants and warrants that all remedial action necessary for the protection of human health and the environment with respect to any hazardous substances remaining on the property has been taken, and any additional remedial action found to be necessary after the date of this Deed regarding hazardous substances existing prior to the date of this Deed shall be conducted by Grantor, Provided, however, that the foregoing covenant shall not apply in any case in which the presence of hazardous substances on the property is due to the activities of Grantee, its successors, assigns, employees, invitees, or any other person subject to Grantee's control or direction.

4. Unless otherwise specified, all the covenants, conditions, and restrictions to this Deed shall be binding upon, and shall inure to the benefit of the assigns of Grantor and the successors and assigns of Grantee.

**IN WITNESS WHEREOF**, the United States of America, acting by and through its Secretary of the Department of Energy, has caused these presents to be executed this_____ day of _____, 1999.

UNITED STATES OF AMERICA

_____

WITNESSETH:

_____

_____

State of Ohio )
County of Montgomery ) SS.

Before me, a Notary Public in and for said State and County, appeared this day ____ of _____) 1999, _____, who acknowledged that she is the Manager of the Ohio Field Office for the United States Department of Energy, with full authority to execute the foregoing on behalf of the United States of America, and who acknowledged the above to be her signature and her free act and deed.

SEAL _____

_____Notary Public

Appendix B

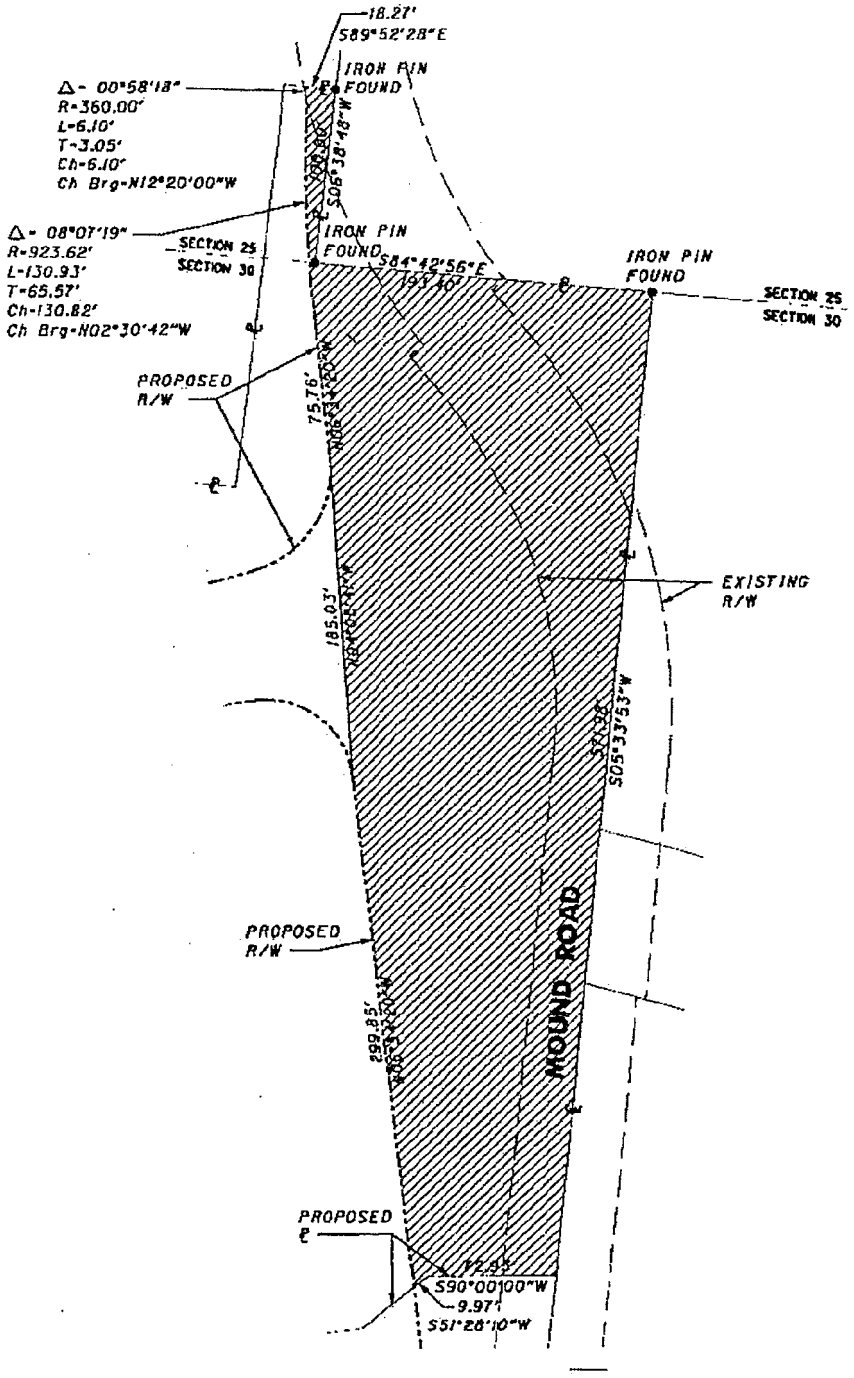
Legal Description of RB H

## H "Wedge"

Situate in the County of Montgomery, in the State of Ohio and in the City of Miamisburg, part of Section 25, Town 1, Range 6 MRs and part of Section 30, Town 2, Range 5 MRs and being more particularly described as follows: **Commencing** at an iron pin found on the southerly projection of the centerline of Mound Road, said point also being the northeast corner of a 164.13 Acre tract of land as described in Deed Book 1246, Page 45 of the Deed Records of Montgomery County and being the **TRUE POINT OF BEGINNING,** .

thence South 06° 38' 48" West, 100.00 feet to an iron pin found; thence South 84° 42' 56" East, 193.40 feet to an iron pin found; thence South 05° 33' 53" West, 571.98 feet to a point on the centerline of Mound Road; thence due West, 72.93 feet to a point; thence South 51° 28' 10" West, 9.97 feet to a point on the proposed westerly right-of-way of Mound Road; thence along the proposed westerly right-of-way of Mound Road, North 06° 34' 20" West, 299.85 feet to a point; thence North 04° 05' 41" West, 185.03 feet to a point; thence along the proposed westerly right-of-way of Mound Road, North 06° 34' 20" West, 75.76 feet to a point; thence along the proposed westerly right-of-way of Mound Road, on a curve to the right for a distance of 130.93 feet with a radius of 923.62 feet and a central angle of 08° 07' 19" and a chord distance of 130.82 feet and a chord bearing of North 02° 30' 42" West to a point; thence along the existing westerly right-of-way of Mound Road, on a non-tangent curve to the right for a distance of 6.10 feet with a radius of 360.00 feet and a central angle of 00° 58' 18" and a chord distance of 6.10 feet and a chord bearing of North 12° 20' 00" West to a point; thence South 89° 52' 28" East, 18.27 feet to the **POINT OF BEGINNING.**

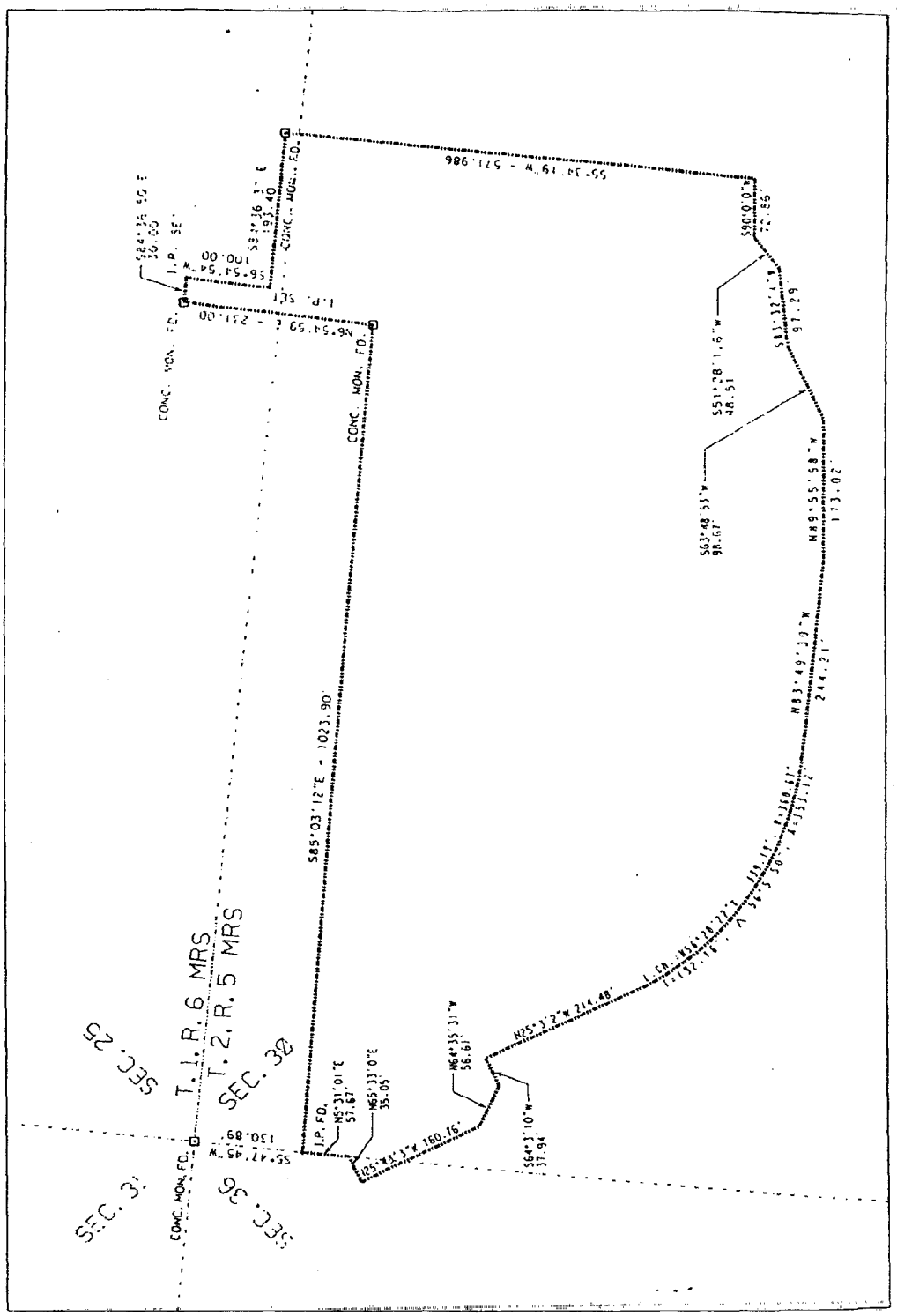
Containing 82,149.70 square feet, 1.886 acres more or less, and subject to all legal highways, easements, and agreements of record.


18.27'
S89°52'28"E
IRON PIN FOUND
Δ = 00°58'18"
R=360.00'
L=6.10'
T=3.05'
Ch=6.10'
Ch Brg=N12°20'00"W
S06°38'48"W
Δ = 08°07'19"
R=923.62'
L=130.93'
T=65.57'
Ch=130.82'
Ch Brg=N02°30'42"W
SECTION 25
SECTION 30
IRON PIN FOUND
S84°42'56"E
191.40'
IRON PIN FOUND
SECTION 25
SECTION 30
PROPOSED R/W
75.76'
N06°34'25"W
EXISTING R/W
185.03'
N08°42'41"W
S05°33'53"W
MOUND ROAD
PROPOSED R/W
299.85'
N05°33'20"W
PROPOSED ℄
12.94'
S90°00'00"W
9.97'
S51°28'10"W

## Release Block H

Situate in the State of Ohio, County of Montgomery, being in the City of Miamisburg, being part of Section 30, and Section 36, Range 5, Township 2, lying in the Miami Rivers Survey (M.R.S.), and being part of city lots numbered 2258 and 2259 within the Corporation Limits of the City of Miamisburg, and being more particularly bounded and described with bearings referenced to the Ohio State Coordinate System, South Zone, as follows:

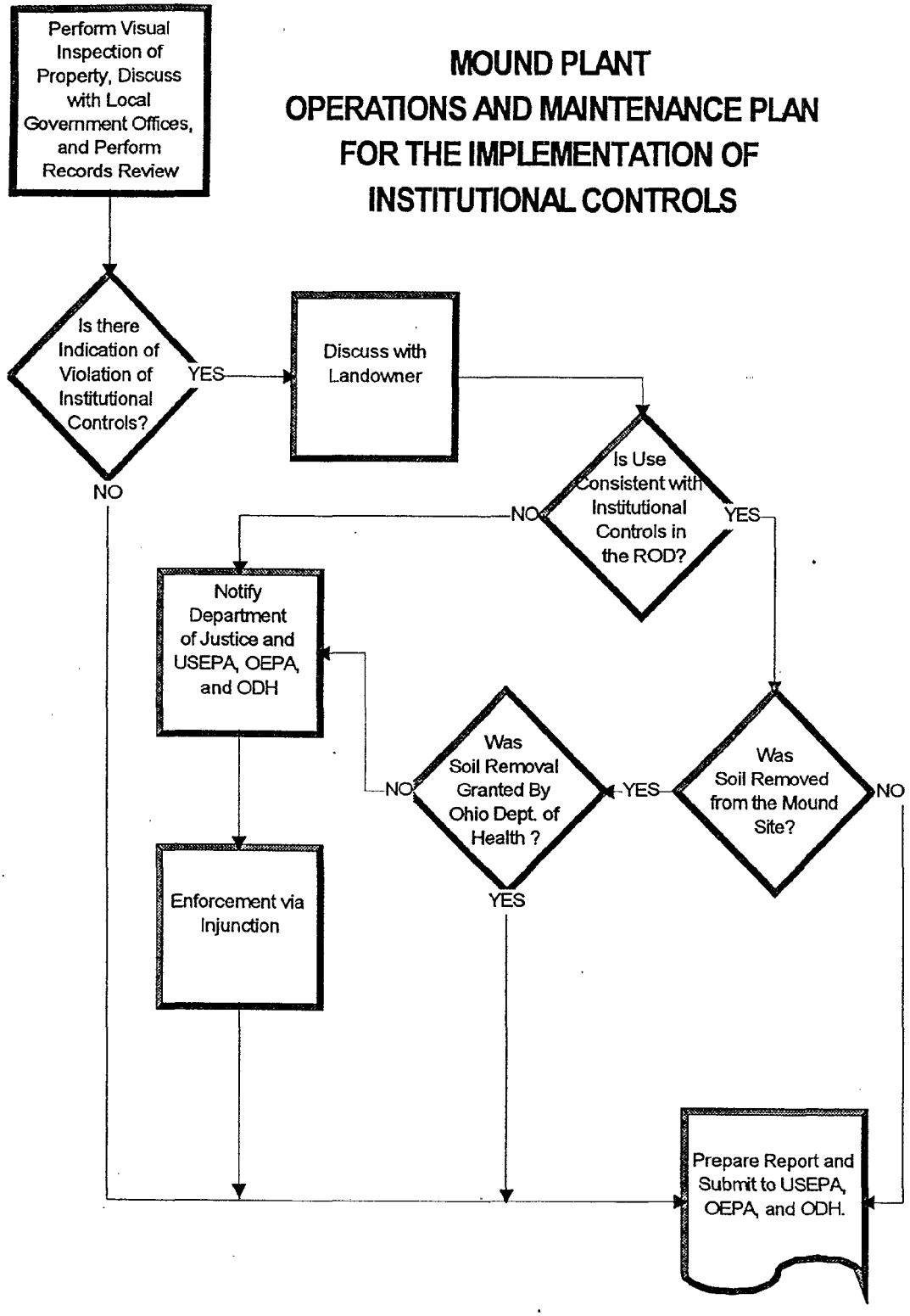
Beginning at a concrete monument, being the North East corner of Section 36 and the North West corner of Section 30, and being the point of beginning for the land herein described, thence S 5$^{N}$ 47' 45" W 130.89 feet to an iron pin being the TRUE POINT OF BEGINNING; thence S 85$^{N}$ 03' 12" E 1023.90 feet to a concrete monument, thence N 6$^{N}$ 54' 59" E 231.00 feet to a concrete monument, thence S 84$^{N}$ 36' 50" E 30.00 feet to a iron pin, thence S 6$^{N}$ 54' 54" W 100.00 feet to a iron pin, thence S 84$^{N}$ 36' 37" E 193.40 feet to a concrete monument, thence S 5$^{N}$ 34' 19" W 571.986 feet along the center line of Mound
Road to a point, thence S 90$^{N}$ 0' 0" W 72.86 feet to a point, thence S 51$^{N}$ 28' 1.6" W 48.51 feet to a point, thence S 83$^{N}$ 32' 4" W 97.29 feet to a point, thence S 63$^{N}$ 48' 53" W 98.67 feet to a point, thence N 89$^{N}$ 55' 58" W 173.02 feet to a point, thence N 83$^{N}$ 49' 39" W 244.21 feet to a point, thence along the arc of a curve to the right having a radius of 360.67 feet for a distance of 353.12 feet to a point, thence N 25$^{N}$ 03' 02" W 214.48 feet to a point, thence S 64$^{N}$ 03' 10" W 37.94 feet to a point, thence N 64$^{N}$ 35' 31" W 56.61 feet to a point, thence N 25$^{N}$ 43' 03" W 160.76 feet to a point, thence N 65$^{N}$ 33' 00" E 35.05 feet to a point, thence N 5$^{N}$ 31' 01" E 57.67 feet to a iron pin being the true point of beginning containing 14.29 acres more or less, and subject to all legal highways and easements of record.


T. 1 R. 6 MRS.
T. 2, R. 5 MRS
SEC. 25
SEC. 30
SEC. 31
SEC. 36
CONC. MON. FD.
I.P. FD.
S85°03'12"E - 1023.90'
N25°32'W 214.48'
S64°31'10"W
37.94'
N64°35'31"W
56.61'
N65°33'0"E
35.05'
N5°31'0"E
57.67'
S25°33'3"W 160.76'
N89°55'58"W
173.02'
N83°49'39"W
244.21'
S90°0'0"W
72.86'
S81°32'4"W
91.29'
S51°28'1.6"W
48.51
S63°48'51"W
98.67'
S84°26'50"E
30.00'
S83°36'31"E
193.40'
N6°54'59"E - 231.00'
N5°54'95"E
100.00'
S5°32'19"W - 521.986'

# Appendix C

# Mound Plant Operations and Maintenance Plan for the Implementation of Institutional Controls

# MOUND PLANT
# OPERATIONS AND MAINTENANCE PLAN
# FOR THE IMPLEMENTATION OF
# INSTITUTIONAL CONTROLS



# Appendix D

# Listing of Applicable Relevant and Appropriate Requirements (ARARs)

## Chemical Specific ARARs

| | |
|---|---|
| OAC 3745-81-11, | Maximum Contaminant Levels for Inorganic Chemicals |
| OAC 3745-81-12, | Maximum Contaminant Levels for Organic Chemicals |
| OAC 3745-81-13, | Maximum Contaminant Levels for Turbidity |
| OAC 3745-81-15, | Maximum Contaminant Levels for Radium 226, 228, Gross Alpha |
| OAC 3745-81-16, | Maximum Contaminant Levels for Beta Particle & Photon Radioactivity |

## Location Specific ARARs

| | |
|---|---|
| ORC 6111.03, | Protection of Waters of the State |
| ORC 3734.20, | Description of OEPA Director's power for Protection of Public Health and the Environment |

## Action Specific ARARs

| | |
|---|---|
| ORC 317.08, | Criteria for County Recording of Deeds |
| ORC 5301.25(A), | Proper Recording of Land Encumbrances |